

DUN'S REVIEW and Modern Industry

A *Dun & Bradstreet* PUBLICATION

JULY, 1954
75 cents



**BETTER
EXECUTIVE MATERIAL
through in-plant
training 29**

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RESEARCH:
How much does it tell
you about consumer
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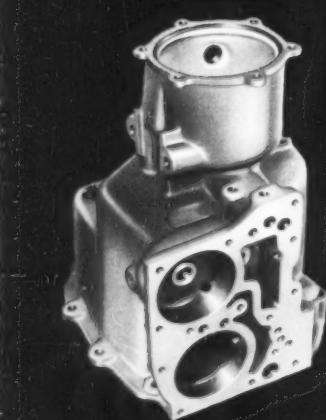
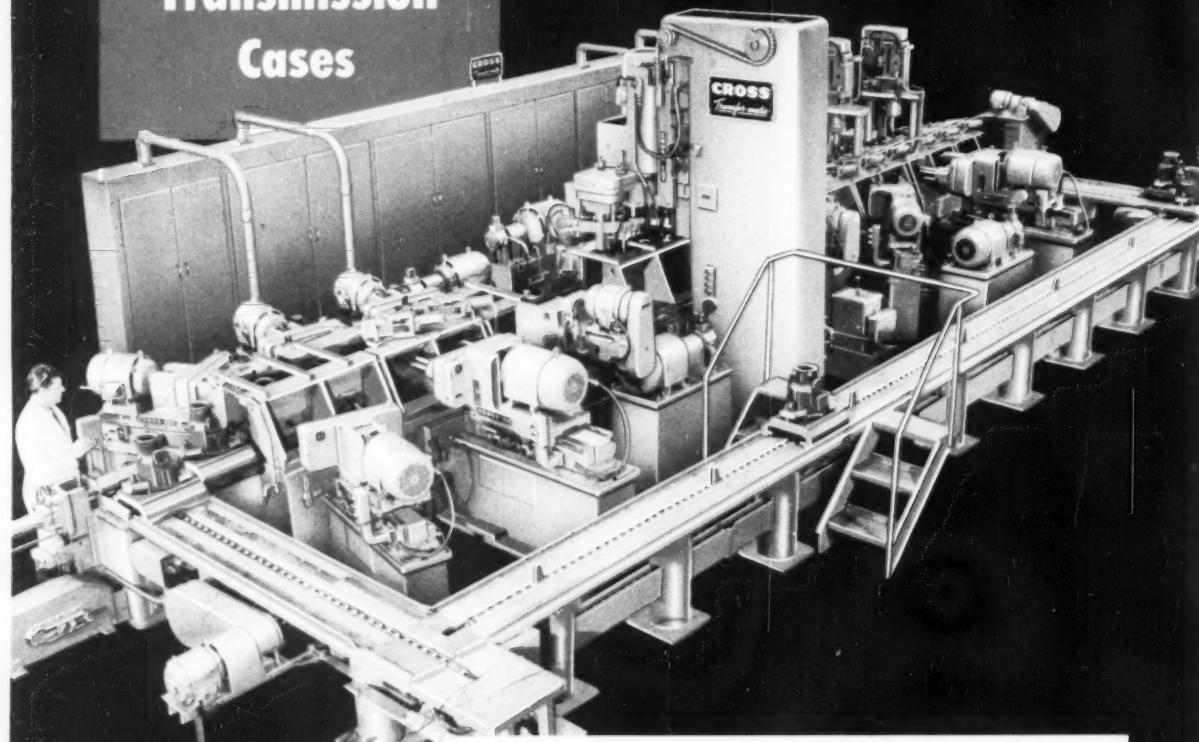
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Drills, Bores,
Reams and Taps
Transmission
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Another Transfer-matic by Cross

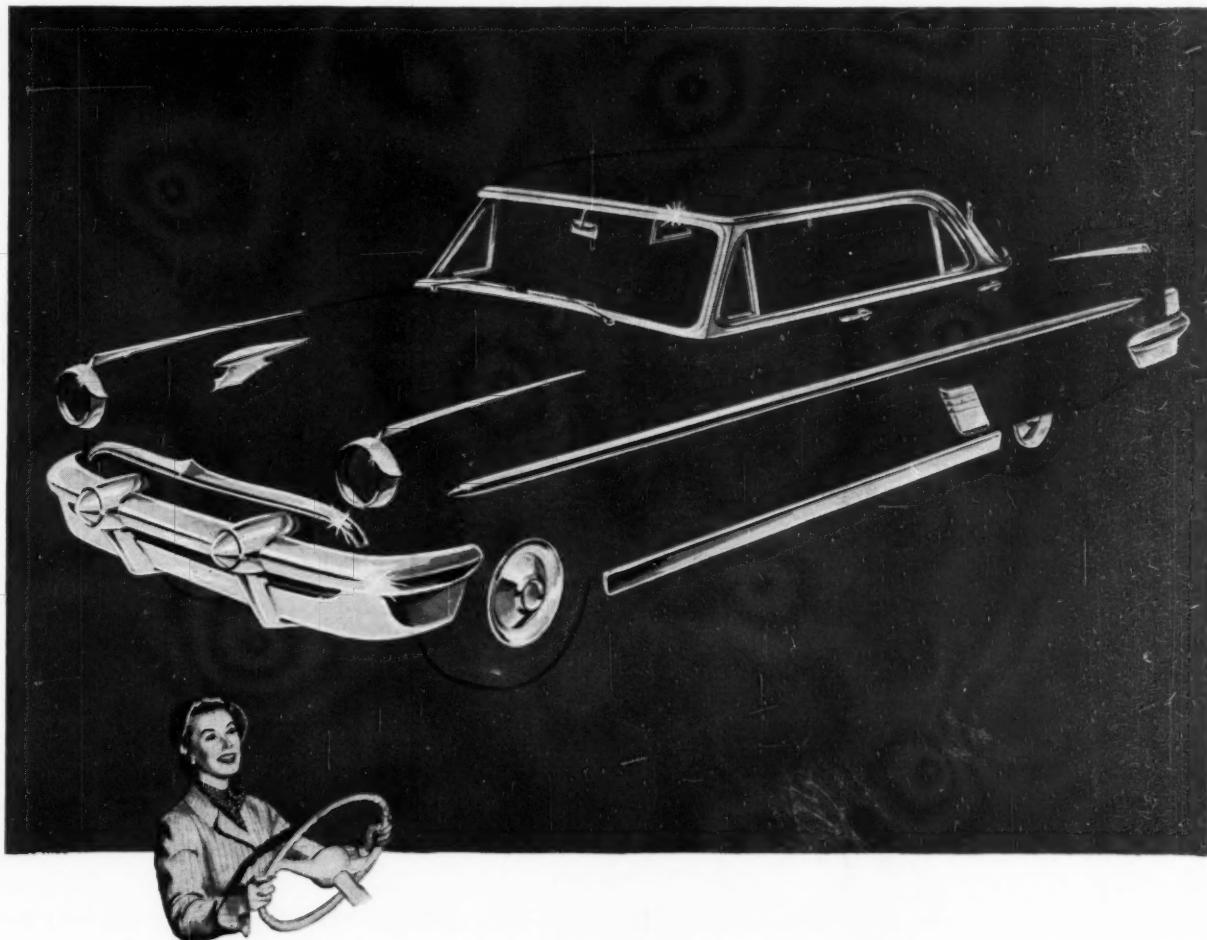


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DUN'S REVIEW

and Modern Industry

Home-Grown-Executives..... 29

EDWARD PLAUT
President, Lehn & Fink Products Corporation

Training for management positions involves more than noble aspirations for employer and employee. The many factors involved make it almost imperative to have many potential top executives and greater opportunities for them.

Consumer Motivation Research..... 30

JAMES K. BLAKE
Marketing Editor

Claims are it strips bare the actual attitudes of consumers toward your product and shows how to turn them into more sales. As a management tool, how sharp is its cutting edge? Big companies use it, others shy away. How much is gold, how much gimmick?

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PETER F. DRUCKER

The top management of any company is the dynamic force behind policy, production, progress, and the many other factors of successful corporate life. In this article, the sixth of a series, the author discusses the decisive rôle of the executive group.

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Paul Wooton reflects random thoughts of cabinet members and other high officials in his report from the Nation's Capital.

Voice of Business..... 8

Here are quotes to show what top management men are saying about the business and community problems which are facing America to-day.

Photo Visit..... 15

Plenty of pictures reveal the successful way employees at The Foxboro Company keep each other informed about products they help make.

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Our readers report on what they find right—and wrong—with our magazine. They compliment, they criticize, they amplify—freedom's privilege.

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Sun Power for Your Plant..... 36

ANNESTA R. GARDNER
Industrial Editor

Solar batteries and furnaces have made a big splash in the news. How practical are they for your plant and product? Here, to guide your future marketing as well as production plans, are the latest facts about these and other devices for putting the sun to work.

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Taking the pulse of business by analyzing trade, prices, employment, finance, production, and income—all of them vital facets of our national economy and significant indicators of its strengths and weaknesses.

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ALFRED G. LARKE
Employer Relations Editor

Characteristics of the cost-conscious foreman and of the foremen voted by management "most likely to be promoted" are shown in profiles developed by two studies in a Detroit utility by the University of Michigan Survey Research Center.

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The sea can be a rough enemy or a serene friend. In all its changing tempers, perhaps the favorite is the early morning calm.

New Methods and Materials..... 65

New ways to put your product together; ideas to speed production and cut costs; materials that improve performance and add sales appeal.

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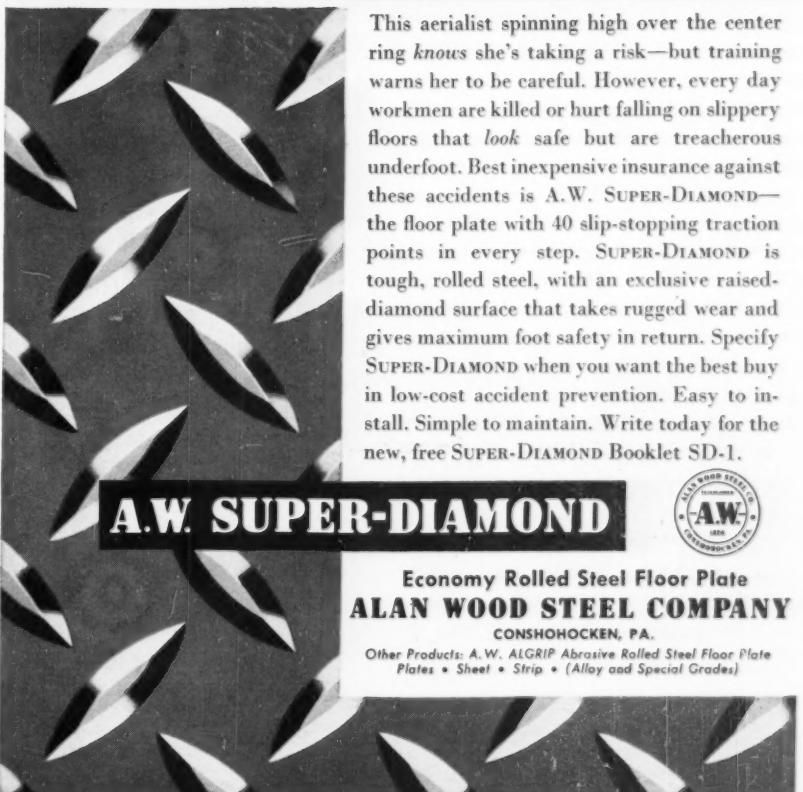
New techniques, products, and uses designed to do things better and more cheaply, surveyed and reported by our editors.

SEMI-ANNUAL INDEX DUN'S REVIEW AND MODERN INDUSTRY will be indexed semi-annually starting with the January-June 1954 index which will soon be available. Copies of the index for August-December 1953, with listings according to subject, title, author, and companies mentioned, may be obtained upon request.

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BUSINESS IN MOTION

To our Colleagues in American Business ...

Many of the millions of people who travel and live in trailers follow a somewhat regular routine. They trek south for the winter, and stay put for months. Then they motor north to a summer place. South or north, they have a need for awnings. You would not think that there would be any special opportunity for improvement in awnings for trailers, yet Revere and an awning manufacturer found one.

These awnings have to be demountable, storable in small space during transit, and of course should be light. An awning maker had been making rafters out of steel tube, in sizes to permit telescoping to save space. Could we save weight without sacrificing strength by supplying aluminum tube? We knew we could, since there is an aluminum tube that is as strong as the steel tube that was being used.

After a careful analysis of the requirements, specifications were set up, and a sample order placed. The specifications included not only the strength of the tube, but also careful control of dimensions, so the two sizes would mate for telescoping, with clearances that would be close, yet not too tight to present problems to the trailer owner.

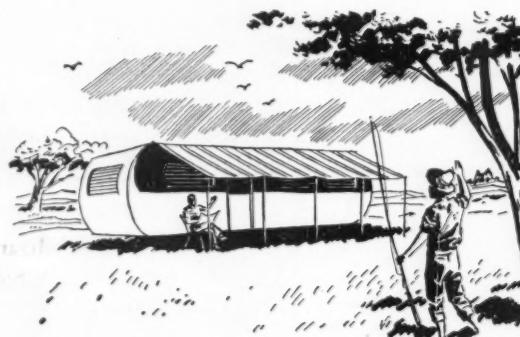
The sample aluminum tube order was thoroughly checked in manufacture, then tested mechanically for strength and for ease of handling in a trailer park. The aluminum rafters made of this tube proved to be easily fabricated, and they withstood the loads im-

posed by wind and rain. They are much lighter, look much better, and the customer reports he realizes economies.

An important thing to remember about this case is that Revere makes tube and pipe in copper and copper alloys, in aluminum alloys, and also electric welded steel tube. This presents a wide choice, and makes it possible for us to recommend exactly the metal and form that will best fulfil the needs for each application. Diversification of Revere Products produces benefits for all.

Revere not only makes aluminum tube, but also aluminum extruded shapes, forgings, electrical bar, coiled and flat sheet. In addition, copper and copper alloys in the same and other forms, plus rolled mouldings and lockseam tube in various metals and alloys. The complete list of Revere Products takes a full page. The Revere

policy is to collaborate as closely with customers as possible. Sometimes we recommend an item that will cost less per pound than what he has been buying. Sometimes we prove that paying a little more per pound will save important sums in processing and improve product life and appearance. Either way, we try to save money for our customers or enable them to make better products. Most other suppliers to industry have the same attitude and policy, so we suggest you consult with them to add their knowledge and experience to yours, for mutual advantage.



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NOW THAT it has been confirmed by the President, Washington has resigned itself to expect an indefinite extension of the cold war. Planning both in the executive and legislative branches of Government is aimed at a continuance of military preparedness at a high level, but within limits that will permit the civilian economy to expand. Some increase over the present level in defense spending is expected.

★ ★ ★ ★

Walter Williams, Under Secretary of Commerce, without qualification or limiting adjectives, says conditions are in the making for a period of great expansion. Dr. Arthur F. Burns, chairman of the President's Council of Economic Advisers, says confidence in the future of the American economy never was higher.

★ ★ ★ ★

Officials are pleased that business did not take too seriously the pessimistic predictions which were fashionable six months ago. In no previous period of contraction, they say, has confidence in the future been so pronounced. Several members of the House Committee on Banking and Currency were positive a few months ago in predicting a business collapse. When Federal Reserve Chairman Martin appeared recently before the committee not a single question was asked in an effort to find support for the pessimistic pictures that had been painted. Martin warned, however, that it would not be wise to anticipate an endless stream of easy money.

★ ★ ★ ★

Renewed interest in the Commerce Department is being shown by Congress. The Victorian Age of the department was during the tenure of Herbert Hoover as Secretary and as President. When the change of administration came its appropriations were drastically curtailed. For the first time in twenty years it is being consulted on labor relations matters. The whole field of transportation is being renewed with emphasis on marine and air carriers. Significant support for the censuses of business and of agriculture exists on Capitol Hill.

Acrimonious discussion of flexible versus inflexible price supports for agricultural commodities failed to arouse outstanding protest from consumers. Even if it becomes necessary because of good crops this year ultimately to authorize \$10 billion for the support-price fund, it is doubted if the public would be disturbed greatly. Farmers themselves probably would move against fixed support prices before the public generally. Acreage restrictions and regimentation in other forms that go with price supports are particularly unpalatable to those as individualistic as are farmers.

★ ★ ★ ★

Defense mobilization officials are hoping that industry will be influenced by the rapidity with which retailing is being decentralized. While some progress is being made in that direction concentration of manufacturing continues to offer "sitting-duck" targets for potential enemies. Increase in home ownership is making it more difficult for industry to carry out government suggestions for "strategic dispersal." Possession of property is making the American labor force less mobile.

★ ★ ★ ★

Nearly every major change proposed in the general revision of the revenue code would have a direct or indirect effect on business. This legislation is regarded as essential if an expanding economy is to be maintained. A partial list of matters which are of greatest concern to business are: Depreciation, dividend treatment, research expense, accumulation of earnings, simplification of taxation of partnerships, corporate reorganizations, loss carryback, accounting definitions, corporate taxes, estate and gift tax changes, tightened definitions of business expenses, employees' benefit payments, handling of annuities, and additional optional bases for estimates of taxes due.

Paul eviston
WASHINGTON, D. C.



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...with the magic of

MARASPERSE

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CHEMICAL DIVISION
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VOICE OF BUSINESS

Understand the human element for success



"To-day's manager . . . cannot live in an ivory tower."

HERBERT L. WERNER

Senior Partner, Werner Textile Consultants, before a meeting of the Kiwanis Club of Atlantic City, N.J.

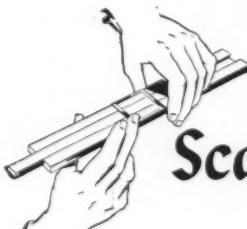
Human engineering and the fostering of good human relations are, to-day, our greatest untapped resource for increasing productivity.

Mill management recognizes today that the decisive factor in productivity is a skill, devotion, and spirit their workers bring to their jobs. More and more, business men

and industrial leaders realize that one of their primary obligations is to motivate people in such a manner that they will work in harmony, with enthusiasm and understanding on the specific tasks with which they are entrusted. These business men and industrial leaders are the men behind the man behind the machine.

To-day's manager, whether he is on top of the executive ladder, such as the president of the company, or a supervisor, cannot live in an ivory tower. The moment he isolates himself from the people in his plant, his decisions will appear arbitrary, unreal, and even silly perhaps, to the men who operate the machines. Once the operator feels that these decisions are not reasonable or sensible, you can be sure that his efforts will be less than his capabilities.

Leadership is either man's most



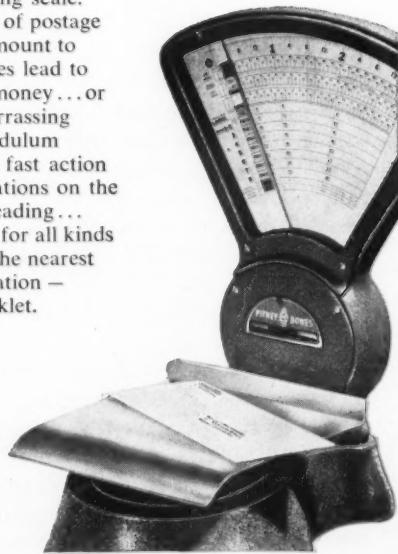
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chase

dust

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Dramatic proof of ANTISEPTIC WESTONE's effectiveness. The hand at left was rubbed across an ordinary untreated section of floor. The hand at right was rubbed over a section which had been treated with dust-controlling ANTISEPTIC WESTONE.

Sweeping only rearranges dust. As a matter of fact, sweeping and floor traffic are the main dust spreaders—not open doors and windows as you might think. And dust is damaging. It spreads many harmful disease bacteria that often cause absenteeism. It affects precision apparatus and delicate finished products. Makes store merchandise, office and institutional floors unsightly.

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ANTISEPTIC WESTONE is economical. It works as fast as a man can walk. One man can do the work of three in maintaining floors. And it goes a long way. One gallon covers 4,000 square feet. Interested? Check the coupon.

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Dept. 1

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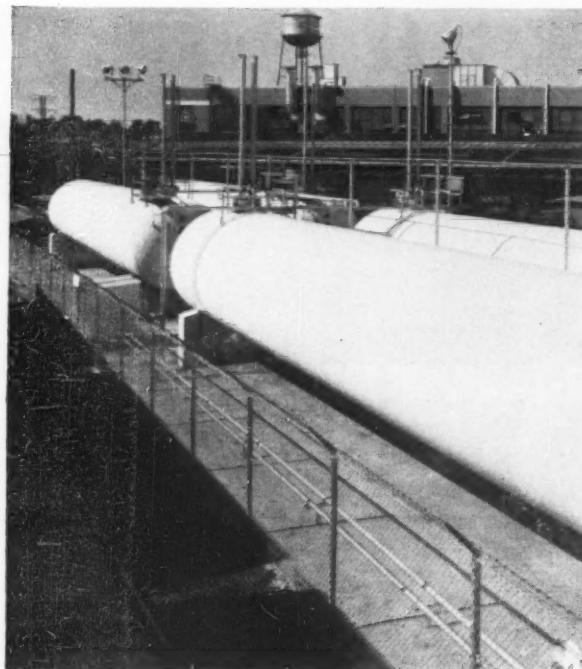
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- QUALITY CONTROLS
- TRANSPORTATION
- PLANT
CONSTRUCTION
ENGINEERING

valuable asset, or his greatest liability, and leadership means using our human resources with vision and understanding, because people, our people, are by far our most precious assets. It has been said that you can buy just about everything, but that you cannot buy people's co-operation, people's devotion to duty, and their enthusiasm. You have to earn it. It's a difficult job.

*The condition of our
industrial machinery*



"... speed up the
replacement of old
and obsolete tools
and equipment..."

HERBERT R. SILVERMAN

Chairman of the Board, National Commercial Finance, Inc., before the New York Credit & Financial Management Association, New York, N.Y.

We are accustomed to hearing laudatory accounts of how far America has advanced in relation to the rest of the world in production of machinery and equipment. However, production engineers tell us that American industry is not well enough equipped with *up-to-date and efficient machinery*. As a matter of fact, they tell us that large segments of American industrial equipment, particularly machine tools, are of old design and incapable of top efficiency.

A recent study, published in *Metalworking Equipment*, showed that more than half (56 per cent) of American industry's most basic production equipment—machine tools and metal-forming units—is over age and much of it of very limited usefulness. . . . These machines are unable to produce goods as efficiently as modern equipment can, thus needlessly increasing production costs.

Further, it has been found that almost one out of five machine tools is more than 20 years old. Most of these machines are so out-dated by modern standards that they have little more than scrap value. Two out of three machine tools are of designs pre-dating World War II.

What is the explanation? The tremendous post-war expansion of the American economy took a lot

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Who helps aluminum carry the load?

Read about the part banking has played in the miraculous progress of aluminum.

It took 4 types of men approximately 125 years to make it possible for the 6-year-old above to hold four sturdy chairs aloft without half trying.

In order they are—research scientists, capital investors, practical businessmen...commercial bankers. Here's what they did...how they reduced the price of a 1-lb. aluminum pig from \$545 to about 20¢!

Aluminum to Gold

In 1886 when Charles Martin Hall, then a student at Oberlin College, first found out how to obtain metallic aluminum by electrolysis, only a handful of Americans were willing to risk their money on the lightest metal

anyone had ever seen.

But they were enough. By the time the '90's got gay, aluminum looked like it might be big business. That's when the original backers—no longer able to finance aluminum by themselves—called in the nation's bankers.

Then and Now

Today (as in the '90's) bank loans help mine bauxite, transport it to processing plants, and convert it to basic aluminum. On the consumer level, bank loans help established companies manufacture or supply aluminum for everything from candy wrappers to canning kettles.

When Money Works

As you can see, banks have had a lot to do with 20¢ aluminum. You have, too. Your money...the money

invested or deposited in banks by all the people...is the foundation of every bank loan. When a man comes up with a good product that you and millions of others want to buy, *your* banker puts *your* money to work in that business. What happens then can best be defined as capitalism in action.

Money goes to work...men and women go to work...goods and services are created...and the entire nation enjoys an unprecedented standard of living.

The Chase National Bank, first in loans to American industry, is proud of banking's contribution to the progress of our country.

* * *

The CHASE National Bank
OF THE CITY OF NEW YORK
(Member Federal Deposit Insurance Corporation)

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Here Are the FACTS About MECHANIZATION The Reasons Thousands of Mass Mailers Are Switching to INSERTING & MAILING MACHINE

EXACTLY WHAT IS "MECHANIZED MAILING"?

It's a method whereby a machine can be employed instead of costly hand labor to gather and insert enclosures; to seal, meter, count and stack.

HOW DOES MECHANIZATION CUT LABOR COSTS?

Machine, run by 1 operator, turns out mail 16 times as fast as hand workers. Slashes pay roll costs to a minimum.

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No expensive pay roll to maintain, no rounding up temporary help. Your machine is always on the job.

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out of our machines. This expansion which has more than doubled our total industrial capacity, has imposed requirements for metalworking machinery that have been met only by more extensive use of old and obsolete tools.

I believe it is incumbent upon the nation to speed up the replacement of old and obsolete tools and equipment if we are to maintain our prosperity, sustain our standard of living, and provide for the national security.

*Vital liaison between
man and management*



"... the personnel manager is the really vital man in the middle..."

W. H. WHEELER, JR.

President, Pitney-Bowes, Inc., before
The California Personnel Management
Association, Berkeley, Calif.

It is no simple matter to persuade people who manage that however willful and selfish people are, they still can and will subdue their individual ways and work in harmony for the common good; that the same individual who resists and foments rebellion against management authority can, by patience, education, and understanding, in the majority of cases, be transformed into a person who co-operates.

It's a difficult thing to get across to a foreman or supervisor that the secret of real leadership is character. . . . It's not easy to convince a manager of men that restraint impresses men most. . . . It's hard to get management understanding that the more we trust employees with all the facts of our business, the more they are inclined to accept our judgment and decisions concerning those facts. . . .

You who work in the relatively new and difficult art of personnel relations must play the key rôle in this job. In my opinion, the wise and persuasive personnel manager is the really vital man in the middle, whose unenviable but challenging task it is to convince management and employees that there are paths to agreement if they will only seek them in good faith.

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for sales facts fast!

Like Advertising itself — the new 1954 STANDARD ADVERTISING REGISTER is bigger, better than ever before — filled with the facts you need for hard competitive selling.

Imagine — 14,000 leading advertisers with their 60,000 executives listed by title — the advertising agency handling the account — media used — amount spent—13,000 brand names! Yes, they're all there ready for you to use in the new 1954 "Red Book".

Better get the facts by dropping us a line on your business letterhead now. We'll take it from there and send you full facts fast!

The Register Contains

- The Advertiser, Address, Capitalization
- Products with Trade Names
- Corporate Executives
- Advertising Manager
- Sales Manager
- Printing Buyer
- Advertising Agency Handling Account
- Account Executives
- Advertising Media Used
- Advertising Appropriations
- Sales Character, Extent of Distribution

THE AGENCY LIST

Standard source of information about 3,000 U.S. and Canadian advertising agencies with data on their recognition, personnel, and over 30,000 clients. Issued three times a year — the AGENCY LIST is part of STANDARD'S complete service or may be purchased separately.

Free Write for colored illustrated booklet giving full information about the STANDARD ADVERTISING REGISTER and Supplementary Services. It's yours for the asking.

NATIONAL REGISTER PUBLISHING CO., INC.
130 West 42nd Street 333 N. Michigan Ave.
New York 36, N. Y. Chicago 1, Illinois



Why treasurers love telegrams

They do the job quickly and accurately



Telegrams are the one form of communication that gets VIP treatment right down the line. They move fast, get to the right man, get immediate attention, produce fast action.

All-around business performer



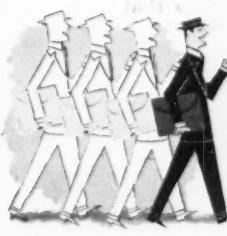
Telegrams do more jobs for more businesses—and do them better—than any other form of communication. Use telegrams for everything from collecting overdue payments to flashing cash to men on the road.

Telegrams eliminate expensive errors



No one has to *remember* what you say in a telegram . . . the facts and figures are right there and *right*—accurate, to the point, exactly as you sent them. No costly mistakes due to misunderstanding.

More manhours ... same payroll



It's like having extra men on the job—extra salesmen, credit men, traffic men, accountants—when you put telegrams to work. Telegrams step up efficiency; cut waste of time and money.

when it means business
it's wise
to wire

WESTERN UNION

WESTERN UNION

CLASS OF SERVICE

YOUR WESTERN UNION REPRESENTATIVE IS A HIGHLY TRAINED EXPERT. HE CAN SHOW YOU HOW TO GET MORE MILEAGE OUT OF YOUR COMMUNICATIONS DOLLAR. JUST CALL YOUR WESTERN UNION OFFICE.

SYMBOLS

M O D E R N I N D U S T R Y

J U L Y • 1954 • 13



A "storehouse" of information, this rapidly spinning cylinder is known as a magnetic drum. It is the vital unit of one of the latest cost-cutting electronic developments for business . . . IBM's "650."

In less than ninety seconds, a businessman can "fire" onto its surface as many as 20,000 figures—all of them important to his business. The machine then can refer to these figures, replace or erase them in a tiny fraction of a second.

The "650" is an electronic file for business data that also does its own file searching and processing of the data, including the most complex calculations, at tremendous speeds.

By eliminating the *need* for so many paper records and by consolidating accounting routines, the "650" reverses the trend to increasing paperwork in business. It increases the *automatic* production of bills, statements, notices, checks, payrolls, reports, analyses and other accounting information. The result: LOWER business costs.

IBM
TRADE MARK

World's Leading Producer of
Electronic Accounting Machines

INTERNATIONAL BUSINESS MACHINES • 590 MADISON AVENUE • NEW YORK 22, N.Y.



MODEL MAKER

RESEARCH ENGINEER

MACHINIST

PHOTO VISIT

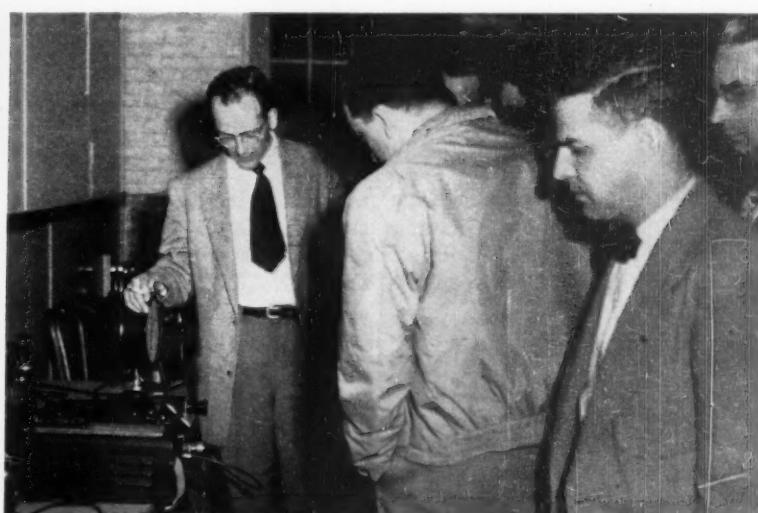
Employees conduct own monthly briefings

WHEN employees specialize on one operation, they never learn, as management knows, the whole story of their company's products unless someone fills in the gaps for them. The more complicated the products, the harder this is to do. At Foxboro, technical-instrument manufacturers, employees themselves found a solution. Monthly meetings that sprang from after-work "swap-talk" are run voluntarily by employees.

Photos indicate what gives these meetings enough drawing power to pull a steady audience from places like the garage, the carpenter shop, and the stenographic department to secure explanation of such technical aspects of instrumentation as infra-red gas analysis, and frequency responses—even though employees attend on their own time; spend 85 cents for a buffet supper; and get no attendance "credit" since such records aren't kept.



Buffet supper beforehand costs 85 cents. Company's print shop produces supper tickets sold in four places around factory. Line-up is for meeting on infra-red gas analysis, transistors, frequency response (105 attended).



Operating demonstrations are always a feature of meetings; with a close look during intermission. Here, frequency response demonstration is scrutinized. Ingenious props, movies, open discussion also enliven the talks.



Basic "4-poster" idea makes tare-less, low-cost unit pack

A Signode unitizing method that can work for you!

Knowing how to do a job makes doing it seem simple. For example, devising a self-unitized pack of corrugated cartons. Signode Packaging Engineers adapted a *basic* unitizing idea to the job. A base of cartons was laid in the jig. Four corrugated "posts" were placed—one at each corner. The rest of the load of cartons was stacked on top the posts—and the entire load was bundled tightly into a tare-less, low-cost, self-unitized pack with Signode Steel Strapping!

Can self-unitized methods cut your packaging and handling costs? You can find out—without cost to you in any way! Ask to have a Signode fieldman call. In the meantime, send for our folder showing **6 BASIC WAYS OF UNITIZING**.

SIGNODE Steel Strapping Co.

2665 N. Western Ave., Chicago 47, Ill.

In Canada: Canadian Steel Strapping Co., Ltd., Montreal • Toronto
Offices Coast to Coast—Foreign Subsidiaries and Distributors World-Wide



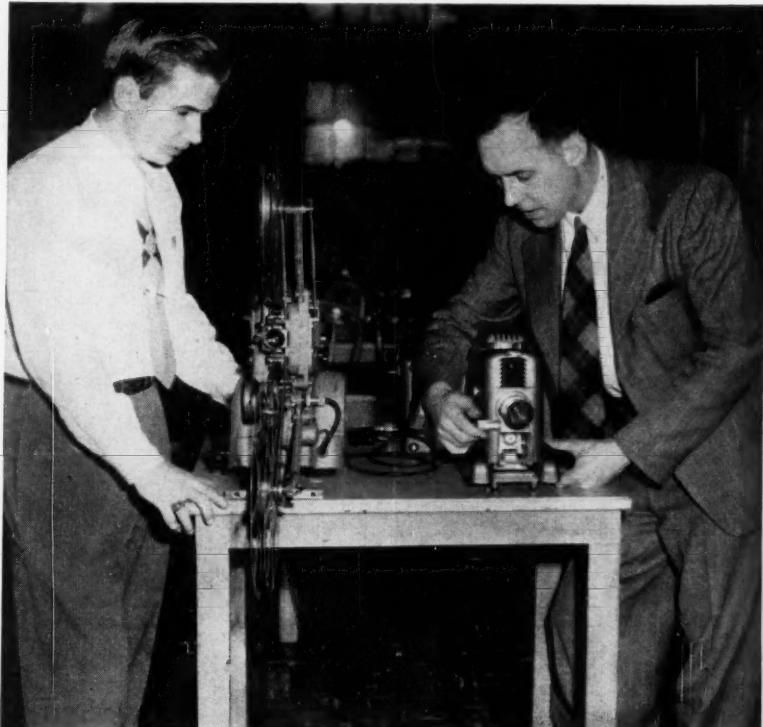
Speech limit is 30 minutes; technical jargon is simplified. Here, H. E. Darling outlines talk on transistors so he won't run over. Secretaries like meetings because they give more meaning to their correspondence work.



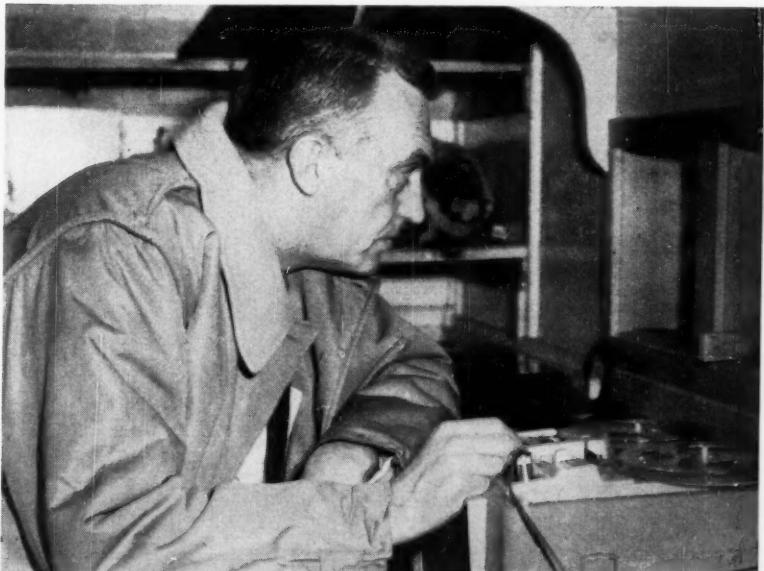
Three o'clock rehearsal on meeting day smooths out evening performance. D. H. Fuller, for example, brushes up his mike technique. The "horse collar" mike allows him to walk back and forth to lectern, props, screen.

produce smooth meeting

Mass. They also clearly illustrate some points made in an article published April 1954 by this magazine: "Anyone can make a good speech."



A last-minute check at rehearsal to prevent mechanical troubles keeps meeting smooth each month: sharpness of movie camera's focus; proper sequence of slides; the working order of props, sound system, and lights.



Speakers' aid: Tape recorder preserves entire program so speakers can play back their talks and improve delivery the next time they are called upon. Windowed booth, next to stage, provides a makeshift sound studio.

Continued on page 20

MR. COST CUTTER SHOWS HOW:

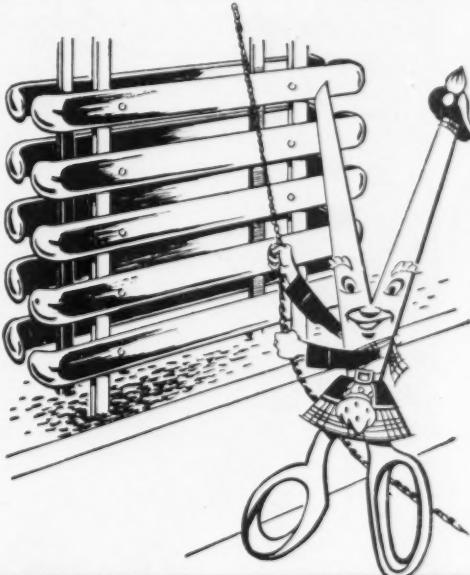
Same power chromium plated 66% more work

Six automobile bumpers were the maximum tank load per plating cycle when the ordinary chromium plating solution was used by one supplier. Any bigger load covered poorly, with consequent rejects.

Then this supplier made a simple change-over. At the recommendation of United Chromium, the ordinary chromium bath was replaced by the Unichrome SRHS

Chromium Solution.

Results were actually better—and cheaper, of course—than physically expanding the plant's capacity. With this up-to-date chromium bath, ten bumpers could be plated, and with no need for additional investment in power! The finish was also produced faster, and with fewer rejects. To top it all, bath upkeep costs dropped, too.



MORE WAYS UNITED CHROMIUM HELPS CUT COST OF COATING METALS

Lower cost protection

In auto plant, Unichrome Plastisol Compound was applied to conveyor hooks much faster and cheaper than the rubber used formerly to prevent scratching of parts. It also lasted twice as long.

Tantalum cuts expenses

Unichrome Tantalum Coils are acidproof to most common acids. Used in a chromium bath, one such installation paid for itself in a year by eliminating downtime losses formerly experienced.

It pays to consult United Chromium on Metal Finishing Problems



United Chromium offers you the advantages of: (1) 25 years of specialized experience in metal finishing; (2) Wide experience in both organic and plated finishes; (3) A diversified line of products for decorative and functional finishing—including plating processes, protective coatings, chemical conversion coatings for zinc; (4) Thinking geared to cost-cutting, product-improving possibilities.

We'd welcome an opportunity to help you "Finish it better AND SAVE."

UNITED CHROMIUM, INCORPORATED 100 East 42nd St., New York 17, N. Y.
Waterbury 20, Conn. • Detroit 20, Mich. • Chicago 4, Ill. • Los Angeles 13, Calif.

In Canada: United Chromium Limited, Toronto, Ont.

You've heard a lot about re-rated motors lately. It's a great step forward—and, like other motor makers, Robbins & Myers has re-rated its motors. But regardless of motor size it will pay you to...

Compare the new re-rated motors before you choose!

Before you make up your mind about re-rated motors, let's see what makes them different from the old frame sizes. New electrical concepts? Not at all! The principal difference is *size*. And engineers have known for years that it takes no special treatment to reduce the size of a motor.

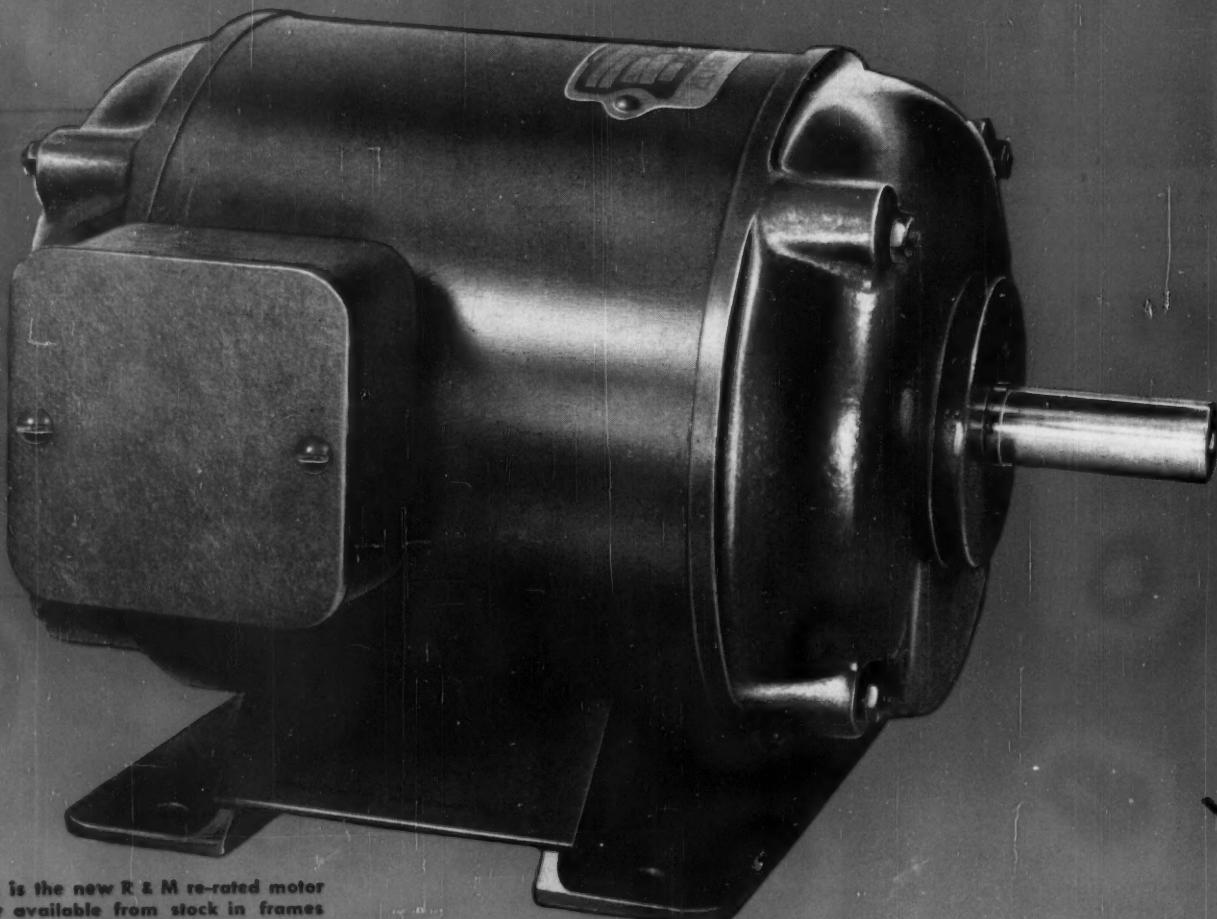
That's why we invite you to compare. You'll see that most of the "new" features you've been reading about lately have been available for years in the Robbins & Myers motor. For instance—screened end-head openings, pre-lubricated bearings, full-height, protective end-heads.

The main reason why R & M motors still lead

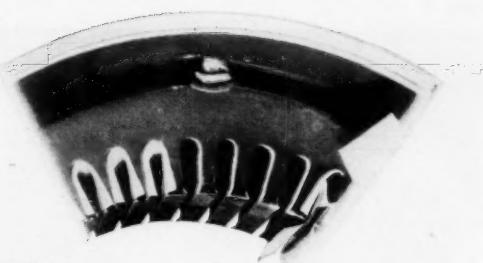
the field is the construction features shown at the right. These are the things that can make or break a motor when it gets into your plant. And their early adoption by R & M has consistently led the industry, as the record shows.

Many of these R & M developments are now in widespread use, of course. That's not a complaint; we're proud of it! But this record of advanced engineering does suggest one thing: *if you want to be sure of getting the latest motor developments, investigate the Robbins & Myers motor.*

Write today for your free copy of bulletin 400MI. It will give you more details.



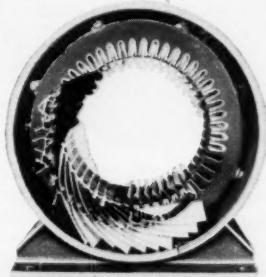
This is the new R & M re-rated motor now available from stock in frames 182 and 184. Frames 213 and 215 will be available in early June.



1912—R & M first to adopt pear-shaped slot cells, allowing more room for copper.



1939—R & M first to make pre-lubricated, sealed ball bearings available on standard integral horsepower motors. Even today R & M gives you the largest bearings for any given shaft diameter!

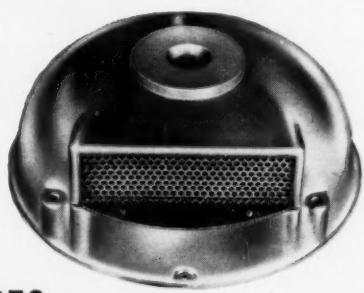


1940—R & M first to insulate between all coil ends, not just phase groups. This gives you 3 to 4 times greater insulating value, and it's still exclusive with R & M.

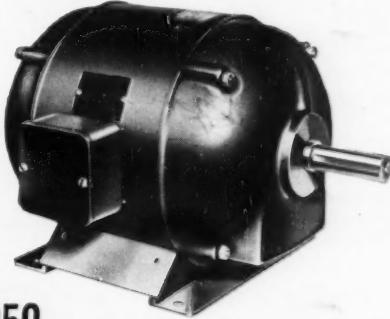


1944—R & M first to provide cast-iron, full-height end-heads; internal parts are accessible only from below.

Only R&M has given you ALL these features!



1950—R & M first to screen end-head openings at no extra cost. Screened openings keep out debris and rats. (Don't laugh: rodents are a real problem in many places!)



1950—R & M first to introduce a truly "weatherized" motor for industry-wide use, indoors as well as out. All motor parts are protected—inside and out—against moisture and dampness.



*If it's an **R&M** it's the Right Motor!*

ROBBINS & MYERS, INC.

SPRINGFIELD 99, OHIO • BRANTFORD, ONTARIO



Fractional & Integral h.p.
Motors & Generators



Electric
Fans



Electric & Hand
Hoists & Cranes



Moyno
Pumps

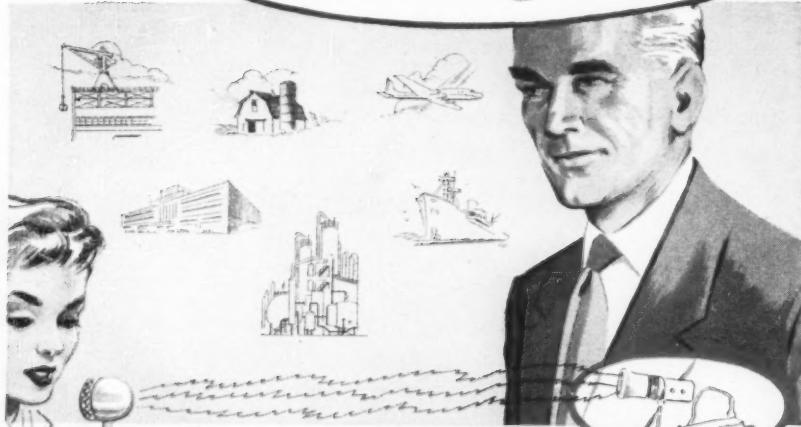


Propellair Industrial
Ventilating Equipment

NOW! Instant Person to Person Communication for every Business, Industry, Institution and Branch of Government.

Dictograph's

MIRACLE PAGE



THE "VOICE IN YOUR BUTTONHOLE" IS CONFIDENTIAL

The transistor-equipped Miracle-Page enables you to be anywhere in your organization—at all times. Miracle-Page tells you instantly when a customer phones or arrives; or, when immediate contact with key personnel is necessary. To reply, you employ the nearest instrument of inside communication. Miracle-Page eliminates clanging bells and blaring "PA" hook-ups which distract personnel and reduce production. **Miracle-Page** is effective as an independent installation or as an integral part of your present system.



Miracle-Page is smaller than your pack of cigarettes...the amazingly compact transistor-receiver unit weighs less than three ounces. The tiny, acoustically precise, speaker on your lapel provides completely flexible "Audio-Mobility!"



Dictograph...the BIG name in profit-making inside communication systems

For over 52 years Dictograph has engineered performance-perfect communication systems which increase management efficiency, employee productivity and protect customer relations. If you are responsible for plus-profit in a business, large or small, request a Dictograph Communications Specialist to report on your problems without charge or obligation.

Exclusive distributorships for Dictograph Communication Products are available. Spade-work advertising furnishes "live" leads. We help train your sales force. We do not charge for franchising.



Dictograph

the voice of successful American business since 1902

Dictograph Products Inc.

95-25 149th St., Jamaica, N. Y.
Please send me further information on

"Miracle-Paging"
 Inside Communication
 Have representative call

DR - 7

Name.....

Institution.....

Address.....

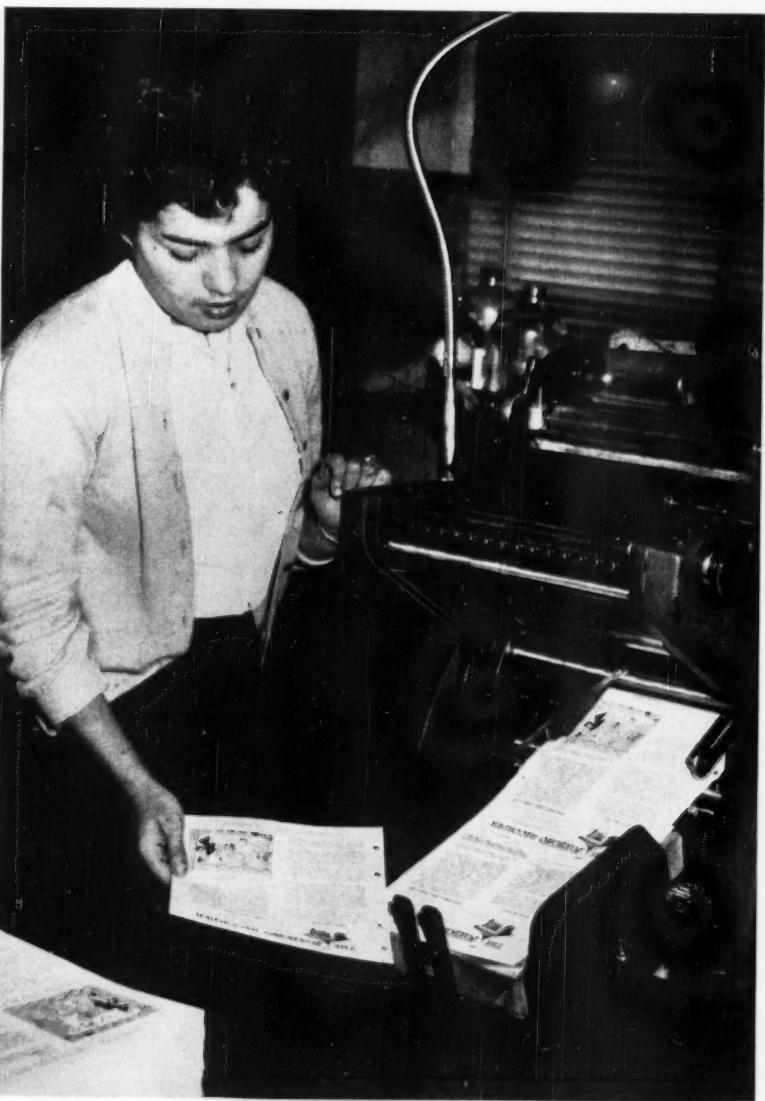
City..... Zone..... State.....

EMPLOYEES CONDUCT BRIEFINGS

Continued from page 17



This seven-man committee, from various departments, meets at lunch time to choose topics, organize each meeting. Past subjects included instrumentation for textile industry; Foxboro's contribution to atomic energy.



Everybody gets in the act: House organ always carries full preview; town newspaper carries meeting announcement, too. Print shop prints supper tickets; carpenter shop makes props; photographic department supplies slides.

BULLDOG ALUMINUM BUStribution® DUCT

helps North American build Super-Sabres



North American
F-100 Super-Sabre

To keep their famous Super-Sabre Jets rolling smoothly off the line, North American Aircraft needed a dependable, flexible power distribution system. That's why, in two installations alone, they installed more than half-a-mile of BullDog Aluminum BUStribution Duct.

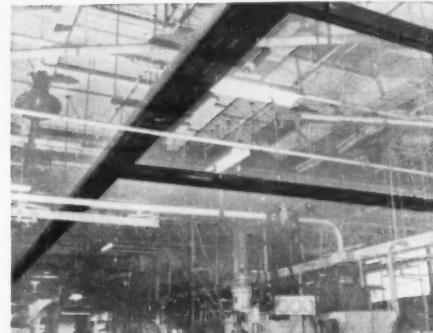
The high bay construction, and the obstacles presented by girders and pipes in the North American plant, were a natural for the use of lightweight aluminum bus duct. The weight saving in each 10' duct section greatly eased the strain of the extra handling required in the installation job. Less dead weight on building superstructures, too.



Export Division:
13 E. 40th Street
New York 16, New York

In Canada:
Dominion BullDog Limited
80 Clayton Road, Toronto 15, Ontario

BULLDOG
ELECTRIC PRODUCTS COMPANY



1600-amp. LO-X BUStribution serves as main feeder to welding department to minimize voltage drop during welds.



600-amp. Plug-In BUStribution, with tap-off provisions each 10", provides 100% coverage of production area with 50-foot runs.

These savings in installation costs — in addition to lower first cost — are prime reasons for the widespread use of BullDog Aluminum Conductors in plants throughout the country.

Aluminum BUStribution Duct features in its design the same quality and dependability that have gained BullDog world-wide reputation as a pioneer of bus bar distribution systems. It is completely interchangeable with other BullDog BUStribution systems and is listed by Underwriters' Laboratories, Inc. For complete information, consult your local BullDog Field Engineer. Or, write: BullDog Electric Products Company, Dept. MI-74, Detroit 32, Michigan. ©BEPCO

SAVE ON COAL

After you've paid for it...

You can't do much to lower the cost of coal delivered at your siding, but you can save substantial manpower, equipment and demurrage charges in getting it from cars to boilers—with Barber-Greene portable, low-cost Coal-handling Conveyors. For example...

847001
ONE MAN UNLOADS
A CAR OF COAL
IN 45 MINUTES

One man with a Barber-Greene 363 Portable Conveyor and 358 Car Unloader can unload—
to stock pile, truck or boiler-coal conveyor—as
many as ten cars of coal in an 8-hour day.
These B-G Units are highly portable, and
handle all bulk materials as well as coal. The
Barber-Greene Portable Conveyor can be moved
all over your storage area and used on a
variety of other work, including reclaiming from stock piles
as well as removing and loading ashes.

849134
ONE MAN
CAN MOVE OVER
400 TONS PER HOUR

This, the Barber-Greene 374 Portable Conveyor,
has the capacity of many permanent conveyors,
yet it can be towed easily behind a truck to
wherever you have a bulk materials moving
problem. Easily operated by one man, it can
cut car unloading costs as much as 90%. Building
high, wide piles, it makes the most of
your storage space.

If you want to save manpower and money in your coal unloading and reclaiming methods, write for bulletins on the B-G equipment which interests you.
BARBER-GREENE COMPANY, AURORA, ILLINOIS, U.S.A.

198

This is
Barber-Greene

A company of engineering and manufacturing experts, developing and building machines... for loading, unloading and conveying bulk materials... for mixing and placing bituminous ("black top") pavement... for ditching... for snow removal.

LETTERS to the Editor

RECORD BREAKER

Portland, Ore.

Dear Sir:

We have great respect for your publication and attempt, repeat, attempt to absorb it from cover to cover, including advertisements.

We very much enjoyed the May article on Record Breakers.

The fireplace equipment industry, in its entirety, is insignificant when measured against some of the giants you pictured. However, our firm is trying hard to be a giant within our own industry.

Despite your word of caution regarding modesty, our 20-foot-two-inch, polished brass fireplace screen is, we believe, the World's Largest Mesh-Curtain Fireplace Screen, and bill it as such. We think that any fireplace that's big enough to keep your car in is newsworthy, and our screen was mounted flush in the fireplace opening, which was not only over 20 feet wide, but also almost six feet high.

We'd be pleased to have you tell

your readers about this, our pet Record Breaker.

W. P. Sherman

Secretary-Treasurer

Portland Willamette Company

GETTING THE POINT

Ithaca, N. Y.

Dear Sir:

... Your article ["Top-Level Sales Communication," January issue] serves a very useful purpose in that it is devoted to a narrow phase of marketing management and explores the subject thoroughly. We need more of these "pin-pointed" analyses in the marketing field.

John M. Rathmell

Assistant Professor of Marketing
Cornell University

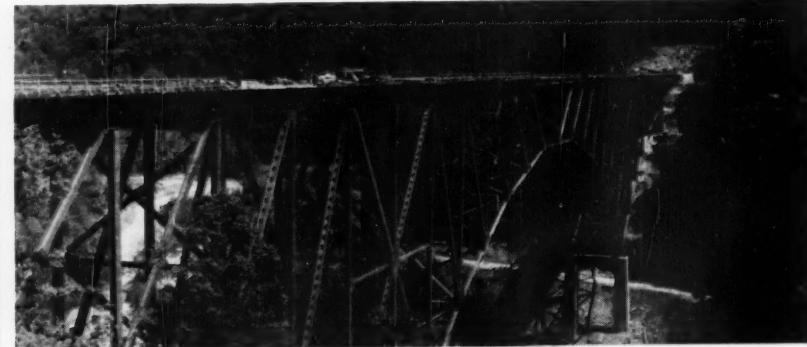
ONE PICTURE . . .

Randolph Field, Tex.

Dear Sir:

The article on "Top-Level Sales Communication" in the January issue is outstanding, and I have just

WEST VIRGINIA'S \$133,000,000 TURNPIKE NEW PROGRESS IN A PROGRESSIVE STATE



TRANSPORTATION for Industry

West Virginia's turnpike, soon to be opened to traffic, is evidence of our State's continued lively progress—firmly binding strategic West Virginia with the populous centers of the East and middle West.

Designed on an heroic scale, the 87 mile turnpike, costing more than \$1,000,000 a mile, knifes through, over and under the Alleghenies from Charleston, the State's capital city, to our southern border, providing a journey of unrivaled splendor. It is destined to be busy, as the first link of a vast turnpike network.

North, South, East and West, the turnpike opens all gates into West Virginia's vast areas of potential industrial wealth with their limitless raw materials, versatile working force, ample power and abundance of water, highway, rail and air transportation.

West Virginia's matchless northern and southern coal fields, supplying 130,000,000 tons of high grade fuel to industry; West Virginia's

tremendous electric power industry, typified by the 1,000,000 kilowatt potential of the huge new generating plant in the Kanawha Valley; West Virginia's northern panhandle steel area, producing 5,368,000 ingot tons a year—each with its families of willing, intelligent workers and today is linked closer than ever before through the West Virginia turnpike miracle.

Above all, West Virginia is a pleasant place to live. There's always a time and place to play with 19 State Parks and 10 State Forests—more than 1,700,000 acres of public lands devoted to recreation. Large industry or small business, YOU should know about the State of Progress—West Virginia. Confidential information is available to Companies interested in West Virginia's industrial opportunities. Write or phone: Executive Director, West Virginia Industrial & Publicity Commission, State Capitol Building, Room DR, Charleston 5, West Virginia.

WEST VIRGINIA INDUSTRIAL & PUBLICITY COMMISSION

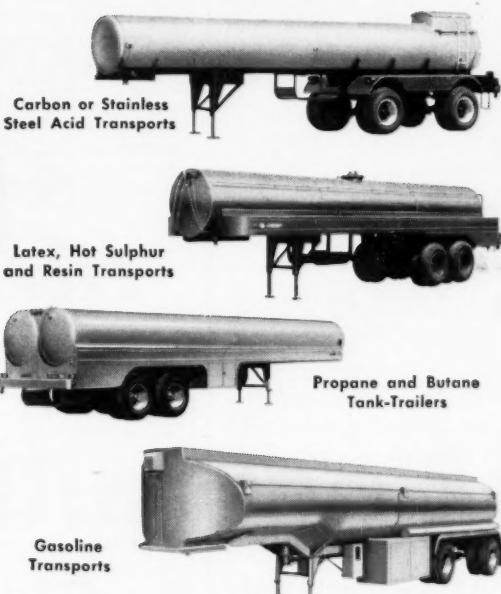
VENUS FOODS, Los Angeles processor of dates, fig bars, beans and dried fruit, utilizes closed Fruehauf Vans for fast, direct distribution throughout the Southwest. Processors and manufacturers of many types find Fruehaufs a faster, more convenient means of shipment.



INDUSTRY IS SHIFTING TO FRUEHAUF TRAILERS...TO CUT SHIPPING COSTS!



NEWLY-DEVELOPED, SPECIALIZED FRUEHAUFS
CUT COSTS IN THE CHEMICAL AND
PETROLEUM INDUSTRIES, TOO!



*Door-to-Door Shipment, In One Operation, Is
The Money-Saving Advantage Of Trailers!*

A SIGNIFICANT CHANGE is occurring in many growth-minded American businesses. Analyzing their shipping costs and realizing the necessity for clockwork schedules and a mobile, economical tool of distribution, these concerns are shifting in great numbers to the "Trailer Idea."

Briefly, the "Trailer Idea" means transportation where you want it and when you want it, on direct routes wherever there are roads, in full or partial loads according to your needs — all with greater economy than by any other shipping medium. Trailers, being direct, eliminate costly in-between switching, re-loading, and re-handling.

In the chemical and petroleum industries, in meat packing and frozen food processing concerns, in the construction and steel industries, in mining, manufacturing, and retailing, newly-developed, specialized Fruehauf Trailers are providing great savings in many stages of shipping. There are units designed to move raw materials in bulk, others for goods in their final state.

New applications of the Trailer Idea, new developments in Fruehauf design, may well hold the answer to lower costs, stepped-up production, faster distribution, and an expanded operation for your firm.

FRUEHAUF TRAILER COMPANY, 10981 Harper Avenue, Detroit 32, Michigan

- Please send me a copy of the free booklet, "New Ways To Profit In Many Industries."
- Please send a complete, illustrated Fruehauf catalog.
- Please have a salesman call to make a confidential "Transportation Cost Analysis" of my business.

 To send this coupon, simply attach to your company letterhead, sign your name, and mail—you'll get action.

No down time in 16 months!



That's the record of this 20-ton Plymouth Diesel owned by Wyatt Metal & Boiler Works, Houston, Texas

This modern Plymouth operates approximately 45 hours a week, hauling, switching and spotting railroad cars in the plant. The operator praises the Plymouth Torqomotive* Drive because it eliminates shifting gears under heavy loads, assures smooth, steady power for peak efficiency, and reduces rough starts and coupling shocks.

"There just isn't anything we have found wrong with our Plymouth," says E. C. Jones, Vice President of Wyatt. "Efficiency in switching has doubled, and we have lost no time due to repairs or maintenance since we purchased the locomotive 16 months ago. It is far above anything we have had experience with."

If you are not enjoying the benefits of "Industry's Smoothest Switchers" write for illustrated catalog of the Plymouth line—models from 3 to 70 ton, Gasoline, Diesel, Diesel-Electric, with mechanical or Torqomotive Drive.

PLYMOUTH LOCOMOTIVE WORKS, Division of THE FATE-ROOT-HEATH COMPANY, Dept. A-19, Plymouth, Ohio.

*Torqomotive Drive: Plymouth transmission with hydraulic torque converter.

PLYMOUTH
TORQOMOTIVE
LOCOMOTIVES

learned how effective it can be as a means of improving the attitudes concerning the use of graphic presentation. Our office prepares a graphic presentation to the Commander and his staff each month by use of color slides which cost only one-fifth as much as the old-style, black-and-white charts prepared on 30-by-40-inch bristol board and left on display in a chart room. We have eight bases, all of which have graphic presentation sections doing somewhat the same thing....

L. P. Henslee
Lt. Col., USAF
Director of Management Analysis
Randolph Air Force Base

OUR POSITION

Toledo, Ohio

Dear Sir:

. . . Congratulating you on the readability of your new publication.

I have one suggestion to make which may or may not be important. It was necessary for me to spend some time in searching for your address, which I finally found on page 152—the next to the last page. I would respectfully suggest that you place this forward in your publication, to be readily reached in approximately the first 20 pages. I almost missed it. . . .

Frank W. Cherrington
President
The Jennison-Wright Corporation

West Grove, Pa.

Dear Sir:

. . . I wonder if others of your readers, like me, would find it much easier to locate your office address if it appeared on your index pages, along with information regarding subscription prices? I had to make quite a search to find it at the bottom of page 3 in fine print.

S. B. Hutton
President
The Conard-Pyle Company

The subscription information also appeared on pages 4 and 152 of the April issue, is now included with the Table of Contents.—Ed.

ON TO BONN

Washington, D. C.

Dear Sir:

The U. S. Information Agency has received from its office in Bonn a request for permission to reprint Margaret L. Jones' article "Is Management Getting the Utmost from



Get those 'Inside Calls' off your switchboard with New Executone Intercom!

THE NEW EXECUTONE improves all communications: inter-office, office-to-plant, and telephone! Because Executone frees your switchboard of "inside calls" . . . opens all lines for incoming calls! You save money, your customers save money—on call-backs, delays, big phone bills.

And what efficiency Executone introduces—no more running between offices, no waiting for information, no man hunts. With Executone, you get more work done—faster!

Years ahead of its time, "CHIMEMATIC" signalling announces calls automatically. New circuits make voices clearer, instantly recognizable.



Executone

GET THE FACTS

COMMUNICATION AND SOUND SYSTEMS

EXECUTONE, INC., Dept. G-2
415 Lexington Ave., New York 17, N. Y.

Without obligation, please let me have:

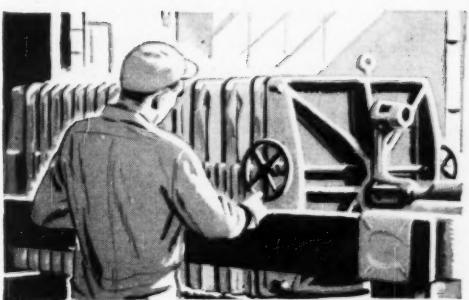
- The name of your local Distributor
- Complete descriptive literature

NAME.....

FIRM.....

ADDRESS.....CITY.....

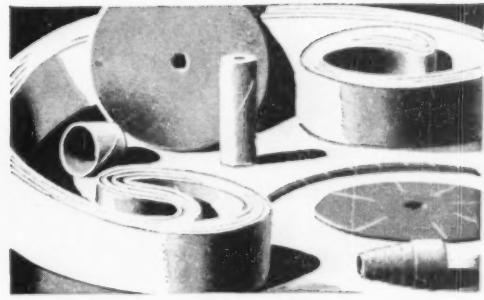
In Canada—331 Bartlett Ave., Toronto



Filter cloths woven from acrylic type fibers are low in absorption, resilient and highly resistant to acids used in chemical processing.



Wellington Sears reinforcing fabrics insure long life and top performance in rubberized industrial conveyor and power transmission belts.



Sturdy cotton drills, jeans and other Wellington Sears fabrics are widely used to back abrasive coated products—sheets, rolls or sanding belts and sanding discs.

How "Sitting Down on the Job" makes a better auto upholstery



It is one thing to design a better backing fabric for auto upholstery—and another to prove it. The job isn't finished until the fabric is not only tested in the lab, but in use for comfort, flexibility, wear.

Searching out what's *wrong* with a fabric, rather than being content with what's *right*, has helped us develop sateen backings of high strength, and non-woven fabrics of superb flexibility. And it has led us into new fabric constructions that are of great importance to the coating field.

Making fabrics prove themselves in action is standard procedure at Wellington Sears—whether they are destined for laminated airplane plastics, or ocean-going tarpaulins, for chemical filters, or coal conveyors. For over 100 years we have "questioned" our fabrics before marketing them—saving ourselves and you embarrassing questions later on.

For your free copy of "Modern Textiles for Industry"—24 pages of facts on fabric development and application—please write to Wellington Sears Co., Department F-9.

Wellington Sears

A SUBSIDIARY OF WEST POINT MANUFACTURING COMPANY

FIRST In Fabrics For Industry

WELLINGTON SEARS COMPANY, 65 WORTH STREET, NEW YORK 13, N. Y.

OFFICES IN: ATLANTA • BOSTON • CHICAGO • DETROIT
LOS ANGELES • NEW ORLEANS • PHILADELPHIA • SAN FRANCISCO • ST. LOUIS

For These and Other Industries

Rubber	Abrasive	Petroleum
Automotive	Chemical	Mining
Fabric Coating	Food Processing	Ceramics
Plastics	Sugar Refining	Farm Machinery
Canvas Products		
Laundry		

Wellington Sears Offers Many Varieties of These Fabrics

Cotton Duck	Chafe Fabrics
Drills, Twills and Sateens	Synthetic Fabrics
Automobile Headlining	Airplane & Balloon Cloth
Industrial & Laundry Sheeting	Fine Combed Fabrics
Bonded (Non-Woven) Fabrics	

will suppliers carry you... if trouble comes?

No one can tell when adversity may strike—it could be a fire, a national emergency or an industry slump. Most of us tend toward the bright side and don't often think of the importance of financial or technical aid as a consideration when choosing a supplier. But most men of experience agree that it is important to do business with firms that not only have the interest but the ability to carry you in an emergency.

On no less than two occasions—the Great Chicago Fire and the Panic of 1893—our own company would have been out of business had it not been for the cooperation of our sources of supply. So, we speak from experience when we attest to the value of good dependable sources. They may mean the difference between success and failure.

The Ryerson Company, through over 100 years of business, has been privileged to help many firms when the going was rough. So, whether it is just steel in a hurry or help when it counts most, call on Ryerson. You will not be disappointed.

PRINCIPAL PRODUCTS

CARBON STEEL BARS—Hot rolled & cold finished

STRUCTURALS—Channels, angles, beams, etc.

PLATES—Many types including Inland 4-Way Safety Plate

SHEETS—Hot & cold rolled, many types & coatings

TUBING—Seamless & welded, mechanical & boiler tubes

ALLOYS—Hot rolled, cold finished, heat treated

STAINLESS—Allegheny bars, plates, sheets, tubes, etc.

REINFORCING—Bars & Accessories, spirals, wire mesh

BABBITT—Five types, also Ryertex plastic bearings

MACHINERY & TOOLS—For metal fabrication

RYERSON STEEL

JOSEPH T. RYERSON & SON, INC. PLANTS AT NEW YORK • PHILADELPHIA • CHARLOTTE, N.C., BOSTON • CINCINNATI • CLEVELAND • DETROIT • PITTSBURGH • BUFFALO • CHICAGO • MILWAUKEE • ST. LOUIS • LOS ANGELES • SAN FRANCISCO • SPOKANE • SEATTLE

- Its Medical Departments?" published February 1954.

With your permission reprints will be offered to newspapers and magazines in Germany for possible republication.

Leo J. Pinkus
Acting Chief
General Service Branch
International Press Service

FREIGHT CAR FALLACY

Reading, Pa.

Dear Sir:

After many years of association with your organization, we have learned to respect you for your general accuracy . . .

How could you mess up the facts

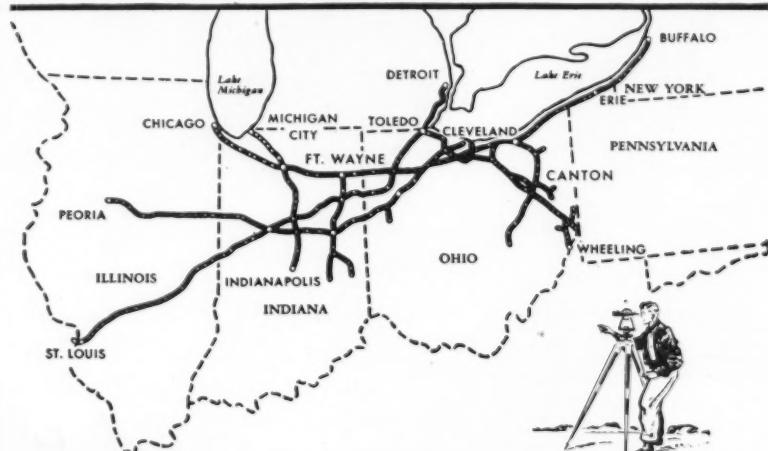
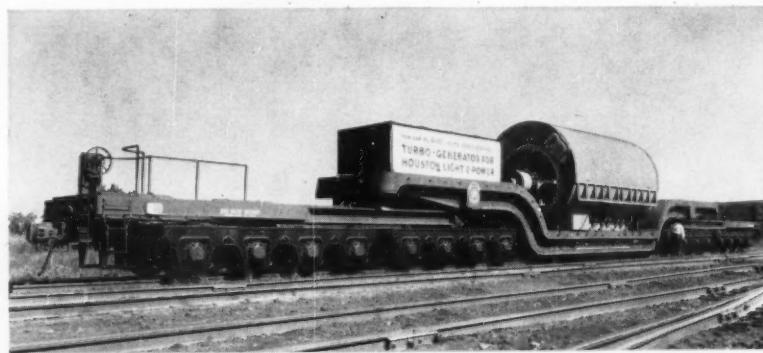
about the Pennsylvania Railroad's super flat car as shown on page 38 of your May issue? You can count more than 24 wheels and the car must obviously be much longer than 58 feet.

All kidding aside, the article on "Record Breakers" is very interesting and the writer hopes to see more in the same vein.

J. Reed Fidler
President

Penn Iron Works, Inc.

Reader Fidler is right. The car (pictured below) is the world's largest, and is 124 feet long, with 32 wheels. Still-newer cars, of same capacity, will be only half as long and will have only 24 wheels.—Ed.



LOOKING FOR INDUSTRIAL SITES?

Let "Nick Plate" send you our detailed and accurate "Along the Line" surveys covering natural and agricultural resources, utilities, labor and other pertinent data relating to each specific location. Just tell us the area or type of location you are interested in. Call or write:

INDUSTRIAL DEVELOPMENT DEPARTMENT

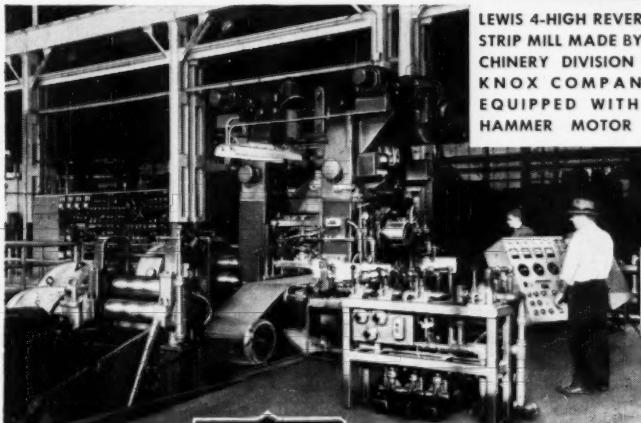
1407 TERMINAL TOWER • CLEVELAND 1, OHIO



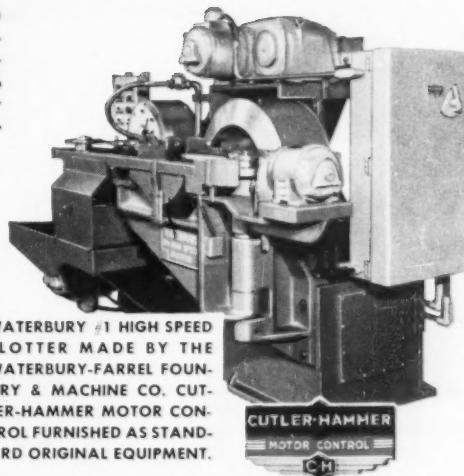
Choice of the Leaders



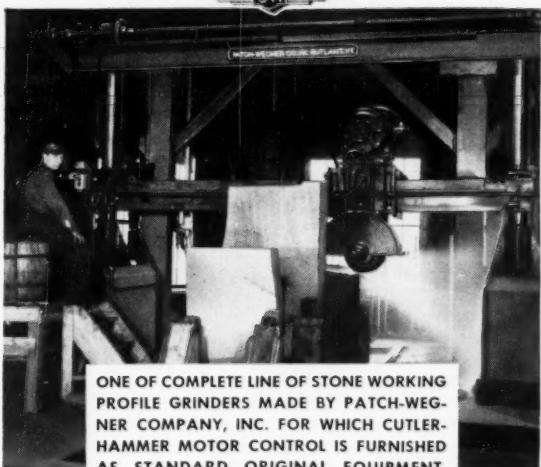
The Mark of
Better Machines



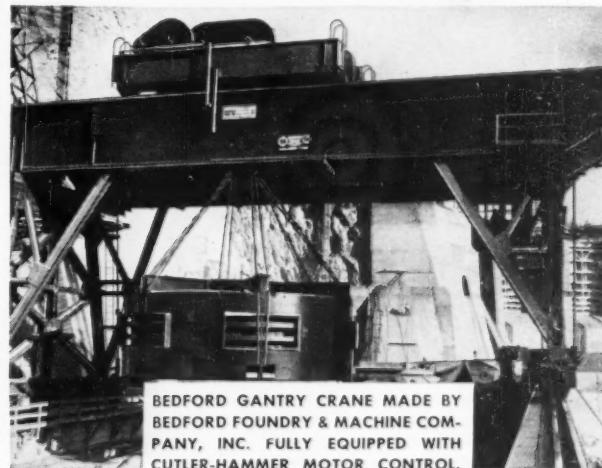
LEWIS 4-HIGH REVERSING COLD STRIP MILL MADE BY LEWIS MACHINERY DIVISION OF BLAW-KNOX COMPANY. 100% EQUIPPED WITH CUTLER-HAMMER MOTOR CONTROL.



WATERBURY #1 HIGH SPEED SLOTTING MADE BY THE WATERBURY-FARREL FOUNDRY & MACHINE CO. CUTLER-HAMMER MOTOR CONTROL FURNISHED AS STANDARD ORIGINAL EQUIPMENT.



ONE OF COMPLETE LINE OF STONE WORKING PROFILE GRINDERS MADE BY PATCH-WEGNER COMPANY, INC. FOR WHICH CUTLER-HAMMER MOTOR CONTROL IS FURNISHED AS STANDARD ORIGINAL EQUIPMENT.

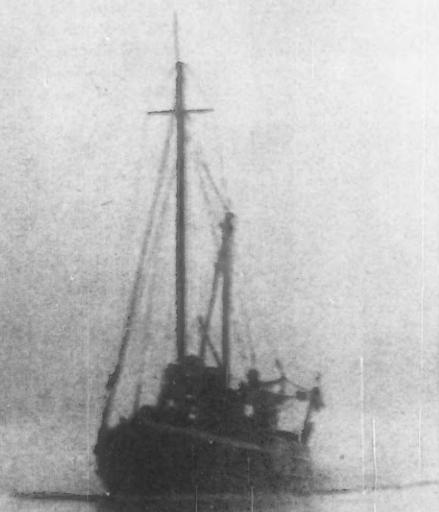


BEDFORD GANTRY CRANE MADE BY BEDFORD FOUNDRY & MACHINE COMPANY, INC. FULLY EQUIPPED WITH CUTLER-HAMMER MOTOR CONTROL.

Good.
Better.
Best...

There is no such thing as a *bad* product of any kind on the American market; competition is too severe for a poor product to exist. But there *are* degrees of merit. Some products are recognized as better than other products. And some few in every field are widely accepted as the *best*. Their makers are acknowledged leaders and their names have become buy-words for assured satisfaction. This position of commercial advantage is neither easily won nor held without a policy of scrupulous attention to every detail influencing product

performance in the user's hands. In accepting this obvious fact no thinking person can fail to be moved by the force of the evidence that Cutler-Hammer Motor Control is so frequently and continuously the choice of the nation's leading machinery manufacturers. You too will find it pays to insist on Cutler-Hammer Motor Control . . . CUTLER-HAMMER, Inc., 1436 St. Paul Avenue, Milwaukee 1, Wisconsin. Associate: Canadian Cutler-Hammer, Limited, Toronto, Ontario.





MONKMEYER PHOTOGRAPH

DETERMINED STEPS CHARACTERIZE THE MEN WITH DEFINITE OBJECTIVES AND PLACES TO GO, BUT OVER-SPECIALIZATION CAN BE HOBBLING TO THOSE WHO ARE EXECUTIVE-BOUND. TODAY, AS IT DID YESTERDAY, RUNNING A BUSINESS DEMANDS BLANKET KNOWLEDGE OF ALL ASPECTS. HOW TO INCREASE SELECTIVITY FOR THE COMPANY AND GIVE ALL POTENTIALS AN EQUAL OPPORTUNITY IS THE AIM OF THIS MANAGEMENT'S EXECUTIVE TRAINING POLICY.

Home-Grown Executives

EDWARD PLAUT
President, Lehn & Fink Products Corp.

TO-DAY'S EMPHASIS upon individual specialization is raising hob with the traditional development of our future top executives. And if something is not done quickly by organizations everywhere—we're going to be in pretty bad shape looking for people from our companies who can take over in the future.

Business leaders are finding it more difficult each year to fill their top-management posts with men prepared to handle the over-all responsibility of administering various branches of a business operation. Every day executives genuinely concerned about the future of their companies bemoan the fact to me that the specialists coming up out of their junior executive ranks just don't have the proper full background for executive leadership.

We know it's not the fault of the individuals themselves. They are specialists—they have to be—and I'm the last to say that we don't need specialists in our middle-management ranks. There is no doubt in my mind that given an

equal opportunity to learn all phases of the company operation the young junior executives of to-day, in their specialized branches, are just as competent for over-all leadership or, perhaps, more so than their predecessors.

So it is up to American industry to institute programs to expand the background of the middle-management men who one day must run the whole show. And it is also to the benefit of all involved to expand that group from which the top executives will be chosen.

Right now the situation is fairly uniform all along the line. We train our newcomers to do a job. They become specialists. The brightest and best ones move along to head their departments. Then we need top executives and we find that the chemist—the engineer—the production manager—the men in the field—just don't come in for consideration. They aren't well known to the president—they are labelled and categorized as specialists. It is the better known boys who are given the top spots.

The lawyer is in and out of the president's office. He is next to the operations of the over-all management; so, too, is the accountant, the advertising executive, and of course the sales managers. It is generally these men who get the call.

Many of our finest leaders come from these groups—and I am very proud of our men in those departments—and am sure many of them will become competent top executives in our organization. But why limit the choice of future leadership to the boy whose specialty happens to bring him close to company management while in his junior executive years?

This catch-as-catch-can program is catching some good leaders, and missing many other outstanding possibilities. It is harming morale in those departments outside the favored category, and depriving competent people of their rightful opportunities—and in the long run definitely shrinking our field of potential top-management leaders to a dangerous point.

Continued on page 42

Consumer MOTIVATION RESEARCH

JAMES K. BLAKE
Marketing Editor

MARKET research has already developed proven techniques for discovering how many people bought what, and for gathering opinions in response to direct questions. Whether those opinions reflect the real motivations behind decisions is often open to question.

In one celebrated survey, for example, a large number of people were asked whether they preferred to drink the light or regular type of a certain brand of beer. A ratio of three to one flatly stated their preference for the light brew. In fact, however, the regular outsold the light beer by nine to one. What the people questioned reacted to, apparently, was the suggestion that only discriminating people drank the light brand, and they preferred to include themselves in that group. The key question for marketing, in this instance, would have involved why people didn't drink the type of beer people drank whom they thought they admired.

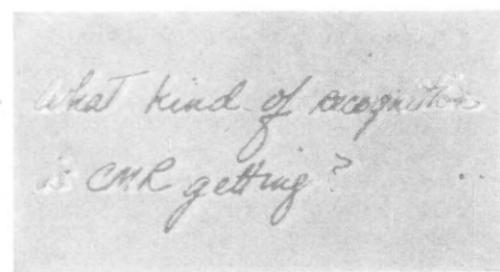
There it was easy to check on the truth of the public's apparent reaction by looking at sales figures. But it is not always possible.

There was, for instance, considerable sales resistance during the early days of instant coffee. Direct interviewing brought out only that consumers blamed the taste. The *Journal of Marketing* describes a test devised to ferret out the hidden motivations. Two shopping lists were prepared, identical except that one specified Maxwell House drip grind coffee and the other, Nescafe instant. The lists were given to alternate subjects who were asked to characterize the type of woman who might have prepared the list.

Here are the results: "(1) 48 per cent of the people described the woman who bought Nescafe as lazy; 4 per cent described the woman who bought Maxwell House as lazy. (2) 48 per cent of the people described the woman

who bought Nescafe as failing to plan household purchases and schedules well; 12 per cent described the woman who bought Maxwell House this way. (3) 4 per cent described the Nescafe woman as spendthrift; none described the Maxwell House woman this way. (4) 16 per cent described the Nescafe woman as not a good wife; none described the Maxwell House woman this way. (5) 4 per cent described the Nescafe woman as a good wife; 16 per cent described the Maxwell House woman as a good wife."

Thus one technique of motivation research showed motives that remained hidden to normal techniques of market research. Not the taste, price, or packaging of the coffee, but the connotations of laziness, bad planning, and careless spending were the social motives dragging down sales.



It is in these areas where verification is difficult or possible only when too late that motivation research is making its greatest contributions. Many motivation research people prefer to put it another way; that when conventional research techniques fail to produce meaningful answers, companies are turning to CMR.

So many turned (and some are still spinning) that 1953 may be known as the year when CMR

finally came of age. During last year, for example, the Advertising Research Foundation saw the writing on the wall and set up a committee to study CMR. To date, they have come up with a bibliography of source material, a glossary of terms, and have sponsored the preparation of a book on CMR by George H. Smith, a Rutgers University professor of psychology, which will be published this year by McGraw-Hill. Published in May was a list of organizations available to conduct motivation research.

During last year CMR received tremendous publicity in the advertising trade press. One of the leading CMR organizations outgrew its quarters, began moving early this year into a large, baronial manor house overlooking the Hudson. Many advertising agencies began to think about adding a psychologist to their staffs, others studied the whole field seriously. In May, the University of Michigan sponsored an advertising conference. Its topic: Consumer Motivation. In June, CMR occupied an entire afternoon at a three-day American Marketing Association meeting in Atlantic City. It's obviously on the way.

Despite its increasing use as a research tool, there is a wide variety of opinion regarding the claims made for CMR and, not surprisingly, a considerable difference of opinion even as to what motivation research is.

As one large ad agency's research director puts it, "Some of it is good, but how much is pure gimmick?" Or, take the ad director of a top manufacturing company who says, "Am I going to base my campaigns going to millions of readers on so-called depth interviews of less than a hundred? Not on your life!" In still another company, the research director says there are as many opinions about CMR as there are people in his department. He, himself, has a

How does management evaluate it?

How good a research tool is it?

Mature technique or experimental?

Is it an advertising gimmick?

Here are some of the facts.

"show-me" attitude. His assistant is sold "100 per cent."

The actual facts are that there is no neat bundle of concepts that anyone can call a theory of motivation. The Freudian group have come closer than any others to wrapping up a package which is more or less internally consistent. But, as nearly everyone knows, there is a good deal of doubt within the psychological fraternity that the patients of Freud were typical and, therefore, that his conclusions are valid for other people in other places at other times.

Consequently, when you ask a motivation researcher about his approach the odds are that he'll tell you he is eclectic. In practise, this means that if an explanation of behavior is logical, he'll buy it regardless of whether it originated with Behaviorists, Gestaltists, or other schools.

The personnel of most CMR groups is another example of eclecticism. The interpretation of raw interview data is usually handled from three different points of view. Not necessarily in this order, an anthropologist checks it with his understanding of socialized behavior as a part of a specific society or total culture. He is able to put it into perspective. The psychologist scrutinizes the interviews, specializing on individual reactions to conscious and subconscious experience. And often, a sociologist, whose specialty is what causes interactions between groups without much reference to any particular cultural background, analyzes the material.

But even the psychologists are not agreed on any particular plan of attack. The group of motives finally accepted may originate in strict and early Freudian psychology which, in general terms, holds that adult behavior represents an unconscious acting out of infantile behavior. In other words, cigarette smoking becomes a manifestation of the infantile need for oral

gratification. Or the motivation may be described in terms of the Behaviorist school, which minimizes more obscure and subjective aspects and places stress on the measurable and objectively determinable. Prejudice against a certain brand of product would not represent an unconscious compliance with a childhood experience, but might be analyzed as a learned way of acting in an adult world. Another psychological splinter group, the Gestaltists, would stress the entire situation and assume that a consumer reacts to a whole series of stimuli which vary over a series of time. They look for the motive in the complete configuration of social stimulation.

This means that the product of a motivation research project has been subjected to interpretations from at least three social sciences. The explanation of the operative motive may originate in any one or all of these hypotheses. The researchers pick ones that seem to fit.

Hidden away under the haze of technical jargon, the basic objectives and approaches of motivation research are fairly simple to understand. It attempts, in any given situation, to answer why people act as they do. Its approach is different from the quantitative pollsters, Gallup, for example, who record direct answers in response to direct questions. CMR assumes that in many situations the person is not conscious of the motives that govern his actions. It further assumes that in other situations where the person is conscious of his motives he would prefer to substitute others when he replies to a direct question.

The motives that govern a consumer's actions arise out of a tangled network of presuppositions, attitudes, feelings, emotions, and images. However complicated, these make the consumer tick. Motivation research tries to identify the meaning of various stimuli. This is not so easy as it seems at first glance. What element or even

copy phrase in an advertisement strikes a receptive chord in a reader's mind? More difficult but even more important is the job of determining how the process functions. Why, for instance, is that chord receptive? If they can translate stimuli into their meanings for consumers, researchers obviously will have driven a wedge deep into the public mind exposing an opening into which advertising, package and product design, and various marketing approaches can penetrate with vastly improved accuracy.

*good claims but
confidential data ...*

The big question for marketing and advertising executives now is whether motivation research is as good as the claims made for it. The answers depend pretty much on your sources. However, it is next to impossible to check on the validity of many claims. The organizations hip-deep in CMR are willing to discuss basic concepts, but their contracts with their clients force them to clam up when asked for actual case data. Comments from manufacturing companies who have used or are using CMR material run like this: "Confidential . . . not interested in having any original material published . . ." "These activities are very expensive . . . highly competitive business . . . reluctant to divulge specific findings . . ." "Reluctant to handle this information in a way which will

make it available to others in our industry. . . ."

The logical and inevitable conclusion drawn from statements of this sort is that the companies have caught hold of something solid. How solid can only be judged by the increasing number of clients netted by CMR organizations.

At present two general types of studies are being made. The more immediately practical are those projects that deal in one way or another with consumer buying habits as related to specific products. Here are some typical examples:

The James M. Vicary Company conducted a motivation study dealing with consumer attitudes towards prunes. Their objective was to uncover ideas, attitudes, and images that could be exploited in advertising copy.

The tests revealed that most people have an emotional block about the laxative connotations of prunes. They would not associate prunes with laxatives until it was suggested. They used, instead, euphemisms like "healthful," or "keeps you fit." Once the word "laxative" was suggested and brought out into the open, what the Vicary group calls the "general level of anxiety" of the respondents was reduced and the responses to other words were clearly influenced by the laxative motivation. People who don't like prunes, for example, were then characterized as being "grouchy, constipated, don't know what's good for them," and so on. Consequently, a key recommendation was that advertising copy should mention the laxative features of the product directly to remove emotional blocks. Says Vicary, "There is no equivocating with the laxative value of the prune." A later study by another group showed that people objected to the withered appearance of prunes. They suggested promoting them as a live, rather than a dead fruit. Sales jumped when packages appeared with the prune transformed into the "California Wonderfruit" shown in bright colors glistening with moist juices.

In a well-publicized series of studies for the *Chicago Tribune*, Social Research, Inc., of Chicago, bore down on consumer attitudes toward beer, cigarettes, and automobiles, three products now woven firmly into the American culture. Here are some samples of their findings on beer: "Beer fits best where equalitarian relaxing is in order. . . . In the upper middle class (professionals, successful executives, owners of larger businesses in any community, and so on) . . . the mark of status is the mixed drink, not beer. When the UMC person . . . wants to be 'one of the boys' he drinks beer to show he is a good fellow." Social Research thinks the best market for beer is the Middle Majority, a sociological grouping of white-collar workers, tradesmen, and skilled and semiskilled workers. This group, they find, "takes their in-between status for granted and have few (psychological) needs to appear classier. More often, they wish to emphasize their likeness to their fellows."

As a result, SRI frowns on the prestige endorser, the high class theme, and the scientific

proof theme in advertising. It recommends informality and casualness in ads, accenting ordinary activities and everyday people to build up beer as a hospitable drink for equals. It finds that intellectuals, glamorous women, and men of distinction types do not fit in with people's concept of the role of beer.

In its research on consumer attitudes toward automobiles, SRI discovered that people regard cars as having distinct personalities. The autos people purchase are selected because they reflect or complement in some way the personality of the consumer. Thus people who want to express dignity, reserve, and maturity tend to buy Plymouths, Dodges, De Sotos, or Packards in dark colors with few gadgets. Cadillacs and Studebakers are typed as showy cars which help people to express extreme attitudes or special needs.

The Institute for Research into Mass Motivations, Montrose, N. Y., conducted an advertising study for a major airline. The airline had been building its campaign around one major theme, stressing to potential customers that, by comparison, air travel was safe. Psychological analysis by IRMM, however, uncovered some interesting facts. First, people really weren't afraid of dying on an airplane. Most of them were worried about something else, something Ernest Dichter of IRMM calls posthumous embarrassment. The mental image that occurred to most air travel prospects was not of death itself, but of friends consoling the wife, saying something like, "Why couldn't he have been sensible and taken the train?" Clearly, the advertising approach was missing the mark. It was the family which had to be convinced.

In another study, this one for the Tea Bureau, Dr. Dichter discovered that tea was usually associated with ill health or tea parties. The connotations of effeminacy or medicine naturally were pulling down tea's sales potential. Recommendations for advertising were to build a masculine personality for tea (a "hearty" drink) and to pitch it as worth drinking for taste alone.

hidden assumptions. In one project, for example, Social Research interviewers began, "We are doing a study of dogs. We want to find out what people think about them, what their experiences have been with them, and so on. Would you please tell me . . . how did you come to get your dog; what went on, how other people in the family felt about it, and so on." At this point a note on the interviewer's sheet reads "Let informant express self freely here with minimal guidance, and give full report (past history, too, of other dogs had, as child, etc.)."

Analyses of these free form interviews, which may last as much as two or three hours (one hour is usually par for the course), shows to skilled psychologists many embedded attitudes and prejudices which a person would not intentionally reveal in response to direct questions.

To enlarge on any information brought out by the interview most organizations use one or more of any number of so-called projective tests. These include word association tests ("I will read you a list of words one at a time and I want you to tell me the very next word you think of. Any word is all right—the main thing is speed. For example, if I said 'paper,' you might say 'book'—do you understand?"); sentence completion tests, thematic apperception tests (subject is shown a picture of a couple driving off in a new car. Subject is asked, "Just make up a little story telling what is going on, how it came about, and how it will come out. Imagine what ideas and feelings there are."). Other tests often used are the Rorschach ink-blot tests and role-playing, and in both of them the subject is asked to project himself into a non-structured situation or picture.

Finally, many organizations carefully compile a dossier of social data about each respondent which aids in evaluating his motives—background, economic position, reading habits, and even house furnishings.

Many of these were being used during the Spring in an exceptionally thorough study being conducted by Dunlap Associates, Inc., of Stamford, Conn. The nature of this project, tentatively titled "Genetic and Other Factors in Cigarette Smoking," demanded that the subject recall events extending back as far as his fifth year. Because of the memory problem involved, Dunlap used only clinical psychologists skilled in aiding recall to conduct its lengthy interviews. Though both Dunlap psychologists and the large company sponsoring the research knew that months of research and thousands of dollars might not solve the problem, the company knew that the answer lay somewhere in the customers' subconscious. The company's sales figures showed how many customers were reacting unfavorably to its product, but greater profits depended on determining what type of persons they were and, so to speak, what made them that way. Consequently, after selecting their sample, the psychologists dug deep into the subjects' earliest memory of the product, into their father-mother relationships, into their

The techniques: inkblots, cartoons, role-playing.

The techniques used to gather motivational data vary somewhat from study to study, depending on the number of people to be sampled and the characteristics of the problem. Basic to most if not all is the technique usually called the "depth interview." In this situation a skilled interviewer encourages the respondent to talk freely on preselected topics. He begins by using open questions and then he deftly probes for

parents' attitude toward smoking, and into their original motives for trying cigarettes. The interesting thing about this project is that, although much of the material will be obviously useful, some of it will not. The psychologists know that some cannot be used without inviting a negative reaction. And for other portions of the material, they know that they *don't* know how the public would react. This is not unusual. By its very nature, motivational research is more precise in its descriptive aspects than in its predictions.

As these examples suggest, motivational research to date is heavily tied in one way or another to advertising research. Companies have used it to check on reactions to copy appeals, product claims, packaging designs, colors, and in various other product choice situations. One TV network is reportedly using motivation research techniques to determine whether certain announcer personality types are favorably associated in the viewers' minds with particular types of products.

A number of advertising agencies, notably Gardner Advertising of St. Louis, and Weiss & Geller of Chicago have gone all out for CMR. Weiss thinks that the hunch era of copy writing has passed, that advertisers who ignore CMR "run the risk of taking a direct slap at the emotional make-up of the potential customer." He told a recent advertising conference about a campaign that showed a woman offering cigars to a group of men. The object was to show that women sanction cigar smoking. "The ad boomeranged," said Weiss, "and through our social science studies we found out why. Men smoke cigars to assert their masculinity and rugged individuality and believe that the habit is objectionable to women. Advertising counter to this emotional attitude deprives the man of one of his strongest reasons for smoking cigars."

There are some agencies, who prefer not to be quoted directly, that are using motivational research techniques without their accounts knowing it in some cases. Says one agency research head, "Too many of our accounts don't understand it. They think we're being semimagical." Says another, "We use it if we have to. We get a great many copy clues from it but we don't want to stress it." Another comments, "The framework of dynamic psychology looks impressive to some of our clients. We find we sometimes need it to sell a good idea." A few agencies retain motivation researchers but most, among those who do this type of research at all, hire psychologists and sociologists on a part-time fee basis from colleges and universities.

A broader approach to motivational research has been carried on since 1946 by the Survey Research Center of the University of Michigan. Its studies are designed to discover the motivations that determine whether or not consumers think any period is a favorable time to make discretionary purchases. The belief of the Center is that consumers' attitudes and expectations

Continued on page 46

WHAT SKEPTICS SAY ABOUT CMR

You tell us what, but not how many. How can we plan?

How many of the recommendations are editorialized? Most of them I've seen just sound like common sense. Too many advertising agencies are leaping into it because it is fashionable. They don't have enough confidence in their own creativity.

A psychologist told us these projective techniques are not worth much unless you know more than you can learn in a 90-minute interview. He thinks they ought to be reserved for clinical studies.

I think they give you attitudes, not motives.

It costs too much.

How can they validate them? For all I know their suggestions may be correct for the wrong reasons.

If you want results you can measure or quantify, you can't start with an unstructured interview. The questions must be identical. The sample is too small. How can 200 people stand for 150 million?

It's OK for a pilot study. It gives some insights, but it is not enough by itself to base planning on.

WHAT CMR ADVOCATES REPLY

The costs per interview are naturally higher than in quantitative interviewing because each interview is combed by psychologists, sociologists, and anthropologists. In terms of usable results the cost is not high, often less than the cost of one full-page ad. The cost varies with how much certainty you want to buy.

What kind of reasoning leads people to believe that 5,000 samples represent 150 million people better than 200? There is more than numbers per se involved in motivation research. We select a representative number of normal people who have been exposed to normal stimuli and we are able to determine how representative their motives are. We interview until a pattern emerges. Once the pattern is clear, further interviewing would be wasteful.

Our answer to the validation question is the same, in the final analysis, as the good one used by the people in quantitative research. We say, "Try it out and check the results on your sales." The depth interviews are not too short. Critics are thinking of psychoanalysis which takes months, not to analyze the patient but to cure him. We have, usually, a small, specific problem and our methods give us enough depth to come up with the answers.

Too many advertisers are looking for a gimmick, a quick, cheap, and easy answer. Complicated motivations often won't co-operate.

In most instances we can't possibly quantify our results. We can say that, based on our research, certain motives provide the key to the problem and most people react this way. Our job is not to specify how many. Standard research tools will answer you that.

"The bottleneck is at the head of the bottle," goes an old saw. No business is likely to be better than its top management, have broader vision than its top people, or perform better than they do. A business, especially a large business, may of course coast for a little time on the vision and performance of an earlier top management. But this only means that payment is deferred—and usually for a much shorter period of time than commonly believed.

CHIEF EXECUTIVE AND BOARD

PART VI OF

The Practise of Management

PETER F. DRUCKER

*S*OME TIME AGO I attended a small dinner party a few men, mostly presidents of sizable companies, gave for one of the "elder statesmen" of American business. The guest of honor had built up a large company from small beginnings, and had managed it with conspicuous success until his retirement to the chairmanship of the board a year earlier. After the dinner he began to reminisce, and soon was talking enthusiastically about the work of his successor. For almost an hour he described how the new president did his job. One by one, I jotted down the various activities mentioned.

When he was through, I had the following list of activities and duties of a chief executive of a business—the most comprehensive statement of its kind that I have ever heard. He thinks through the business the company is in. He develops and sets basic objectives. He communicates the objectives and the decisions to his management people in seeing the business as a whole, and helps them to develop their own objectives from those of the business. He measures performance and results against the objectives. He reviews and revises objectives as conditions demand.

The chief executive makes the decisions on senior management personnel. He also makes sure that future managers are being developed all down the line. He makes the basic decisions on company organization. It is his job to know what questions to ask of his management people, and to make sure they understand what the questions mean. He co-ordinates the product business within the company, also the various functional managers. He arbitrates conflicts within the group, and either prevents or settles personality clashes.

He, "like the captain of a ship," takes personal command in a real emergency.

"One of our main plants had a bad fire five months ago," the speaker said. "It interrupted all our schedules. Rush work had to be shifted to other plants, subcontracted, or postponed. Important customers had to be placated. We had to make an

immediate decision whether to repair the plant or build a new one from scratch. The new president decided to build a new plant. For four weeks Joe spent day and night at the office."

Next on this list of things that the chief executive does, and which only he can do, comes the responsibility for capital-expenditures planning and for raising capital. Whether it is a bank loan, an issue of bonds, or a new stock issue, the president takes an active part in the decision and in the negotiations. He also decides dividend policy. He is concerned with relations to stockholders. He answers questions at the annual meeting. He must be available to the security analysts of such big institutional investors as insurance companies and investment trusts, also the financial writers of the press.

He has to prepare the agenda for the monthly meeting of the board of directors, present the reports there, and be ready to answer questions. And he must relay board decisions to his management people.

The new president has a host of public-relations duties.

Once a month he spends two days in Washington to attend meetings of two governmental advisory boards where he succeeded me as a member, the former president reported. "I am still on the hospital committee in our biggest plant-city, and I still serve on the regional Red Cross board. But the new president has taken over as vice chairman of the Community Chest, and serves on the board of the educational foundation we set up for the children of our employees. And he has been elected a member of the board of trustees of his *alma mater*. He has to attend one or two trade-association meetings each year; usually makes one short speech. Last month, he addressed a meeting of the American Management Association. Once a year we have a convention of our dealers, which the president has to open with a speech. As often, our "old-timers club" of employees has a get-together, at which the president introduces the new members. We also have two or three dinners a year for retiring management people. One of those I still take; the

new president takes the others. And we have a custom of bringing new managers to headquarters. Of course, we bring them in in small groups; eight or nine each year. And it is customary for the president to entertain each group at lunch."

The final item on my list: each year the new president visits personally the company's 52 plants in the United States and Canada. And at the time of the meeting he was planning to visit fairly soon the company's seven plants in Europe and Latin America.

But when the old gentleman stopped, the other people around the table all chimed in and added additional activities.

"Doesn't your president have to see the people who solicit company contributions to the colleges, the hospitals, the charities in your main plant cities?" one man asked. "It's one of my most time-consuming chores," he said.

Another one said, "Don't you have your president sit in on labor negotiations? My personnel vice president insists that I do."

"What about that strike you had in Chicago last year?" asked a third. "Who handled that?"

Not one of the men at the table said: "This or that I don't do but delegate." And it was not until an hour later that one of the company presidents in the room asked the question that had been on my lips ever since the guest of honor had begun to speak: "Say, how many heads and hands does this president of yours have?"

By now I had a list of 41 different activities that experienced company presidents consider to be part of the president's job and that can only be discharged by the chief executive himself.

There is no job that needs being organized as carefully and as systematically as that of the chief executive. The president's day has only 24 hours like anybody else's day. And he needs certainly as many hours for sleep, rest, and relaxation as a man burdened with lesser responsibilities. Only the most thorough study of the job can prevent total disorganization. Only the most systematic assignment of priorities can prevent the chief executive from frittering away his time and energy on the less important activities to the neglect of vital matters. Yet this careful study, this systematic organization of the job are almost unknown.

The only study of the way chief executives actually spend their day has been made in Sweden by Professor Sune Carlson. For several months Carlson and his associates clocked with a stop watch the working day of twelve leading Swedish industrialists. They noted the time spent on conversations, conferences, visits, telephone calls, and so on. They found that not one of the twelve executives was ever able to work uninterrupted more than 20 minutes at a time—at least not in the office.

We have no such study of American chief executives. But everybody who has seen company presidents at work knows that far too many equally let outside pressures and immediate emergencies dictate their day and the utilization of their efforts and energies.

Indeed, the chief executive who lets outward pressures manage him is already the better chief executive. At least he spends his time on activities that are genuinely part of the chief-executive's job (albeit the lesser part). Much worse off is the chief executive who wastes his time running a function instead of the business: the president who entertains customers when he should be working on the capital budgets; the president who corrects details in engineering drawings and neglects a crying problem of malorganization; the president who personally

checks the expense account of every salesman and so forth. These men not only manage not to accomplish their work; they also prevent the operating manager, whose job they are doing, from doing his work. And the number of chief executives who thus cling to the functional work in which they came up, and with which they are familiar, is unfortunately very large.

It should be emphasized that this is not a problem of individual ability, individual intelligence, or individual good will. The problem is one of systematic organization of the job. "He who rides the tiger, reaps the whirlwind," I once heard a speaker say. This, the most thoroughly mixed metaphor I know, is not a bad description of the fate of the chief executive who attempts to manage "intuitively," rather than by systematically studying, thinking through, and organizing his job, work, and time.

A distinguished French industrialist and student of management, Rolf Nordling, recently suggested that the chief-executive's job is the biggest area for the application of Scientific Management, and especially of "work simplification." The first thing to be done would be what Carlson did in Sweden: study the work day of the chief executive with a stop watch.

This is certainly sound. Unless the chief executive knows what he is actually doing, he cannot decide what he ought to do. But (as Nordling, too, hastened to point out) time study must be followed by careful and hard thinking on what the job should be. What activities must the chief executive do himself? What activities can he leave to others—and to whom? And, above all, what activities come first? How much time must be set aside for them and guarded against "crisis" pressures?

The "intuitive" manager, in other words, cannot do the chief-executive's job, no matter how brilliant, how quick, how perceptive he is. It has to be planned. And the work has to be performed according to plan.

The chief-executive's job also quite obviously requires what I have earlier (Part IV) called a "management charter"—a clear statement of the authority and responsibility for decisions. And the principle underlying this must be that decisions have to be made on the lowest possible level. Pushing down decision-making authority as far as it will go is usually advocated as a means to strengthen lower managers and to improve their performance. But the principle is perhaps even more important for the effective organization of the chief-executive's job. The centralizing chief executive not only undermines the performance of his managers; he makes his own performance absolutely impossible.

Adequate organization of the chief executive's job also requires the maximum of federal decentralization. If the chief executive has to make all decisions that go beyond one function and affect a business as a whole, he cannot possibly do an adequate job—not even in medium-sized business. Only federal decentralization, by creating centers of genuine business decisions below the very top, can make the job manageable.

Even if the job is studied most systematically, organized most thoughtfully, and with the maximum of decentralization, it still is not a job one man could or should do. Actually, 90 per cent of the trouble we are having with the chief-executive's job is rooted in our superstition of the one-man chief executive.

There will always be too many activities in the job for any one man's working day. Half the activities in the list I gave earlier could probably be taken out of the chief-executive's job and handed to other people. But there would still be some fifteen or 20 major activities. Each of them would be of vital

Continued on page 55

SUN POWER

for your plant?

ANNESTA R. GARDNER
Industrial Editor

*It's coming up fast, this solar energy field;
and it promises new methods, materials—and markets.*

THE AMOUNT of energy obtained from coal, oil, or even atomic explosions can't begin to compare with the quantity poured on the earth by the sun. A full horse-power falls on each square yard of ground at midday. In a year, the earth receives at least 20,000 times as much energy from the sun as is now generated from all other sources.

Yet putting this energy to work has baffled the best scientific brains. As a direct source of power, the sun has long been an elusive customer. Now, though, there is real hope that it can be captured and put to work.

New technological developments in many fields—ceramics, plastics, electronics, and atomic energy itself—are providing fresh approaches; some of which, as the photographs on these and the following pages show, look promising indeed.

There are still plenty of question marks, of course. And the biggest are still the most basic—the ones that stem from the nature of the solar system itself, and from man's inability fully to control its forces.

The supply of solar energy at any given point is limited by the earth's axis of tilt and its revolution, which control its distance from the sun; and by the earth's rotation, which keeps every point in the dark for at least half the time. The supply of solar energy is also at the mercy of every cloud that floats through the sky. Even the new devices like Bell Telephone Laboratories' "solar battery" (photograph above, right), which can operate on diffuse light, do not operate at full power unless directly exposed to the sun's rays.

This means any plan for direct utilization of solar energy—if there is a need for continuous power—must include some means for storing that energy at reasonable cost. This is not so simple as it may seem. Says the report of the 1952 President's Materials Policy Commission: "Few blanks in man's knowledge are so complete as how the storage of energy may be accomplished. . . . Industrially, he has devised the storage battery in which small quantities of energy can be accumulated for use at will, but otherwise he has little at hand. . . ."

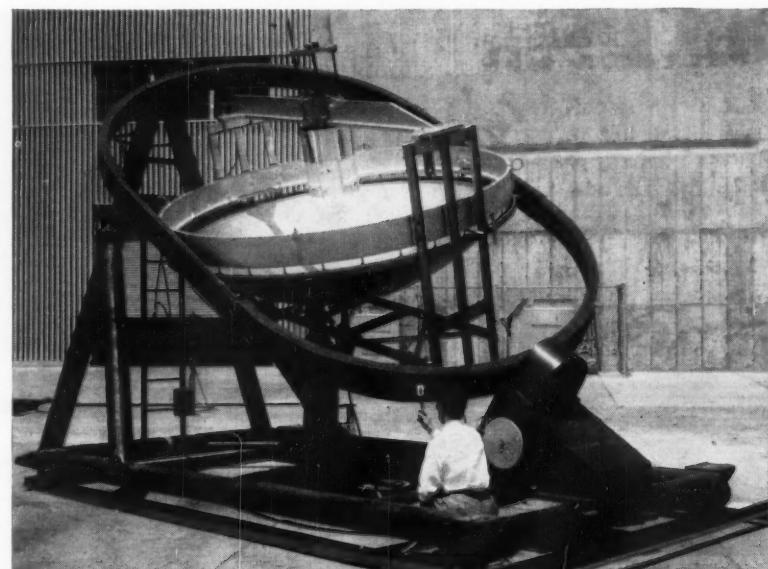
To-day, this problem—and the over-all problem of putting the sun to work—is being attacked from a good many different angles. These include concentration and collection of the sun's rays, direct conversion of sunlight into heat and electrical power, and indirect methods which, in effect, speed up nature's own processes.

Concentration or focusing of the sun's rays to produce intense, but localized, heat—as in the Convair furnace pictured at the right—is one of the oldest and best-known methods for putting solar energy to work. It is a method which is familiar to every Boy Scout. The Convair furnace is new only in that it applies modern design and manufacturing methods to permit a considerably higher heat build-up than has previously been attained.

Nevertheless, this furnace has a number of advantages. As Convair metal-



Solar battery, invented at Bell Telephone Laboratories, converts sun's rays into electrical current, provides power to turn this wheel. Heart of battery, held in man's left hand, is light-sensitive silicon metal strip.



Solar furnace, used by Convair engineers for metallurgical and ceramic research, develops temperatures over 8,000° fahrenheit by concentrating sun's rays at a focal point. Aluminum mirror is 120 inches in diameter.

lurgists point out, a temperature of 8,500° fahrenheit can be obtained under optimum conditions (an oxyacetylene torch gives only about 5,800°); and there is no interference from electric or magnetic fields or furnace gases, such as may occur when standard equipment is used. Furthermore, an aperture in the reflector permits observation of the samples right up to the highest temperatures, and rapid heating and cooling are possible.

A sun-heated boiler developed by Dr. C. G. Abbott of the Smithsonian Institution is also designed to obtain heat by concentration of the sun's rays. But the boiler still seems much too expensive and cumbersome for practical use. Fifty square feet of mirror are required for each horse-power of energy produced. A 10,000-kilowatt electrical generating plant would require some 2,500 tracking mirrors, each 13 by 20 feet, and an equal number of vacuum-sheathed glass boilers. It is estimated that an Abbott boiler with a mirror large enough to produce even two horse-power on a sunny day would cost at least \$1,000.

Right now, concentration of solar energy seems most likely to pay its way when heat is needed for a limited time and for a special purpose. The Convair furnace is a good example. Another is the simple, relatively low-

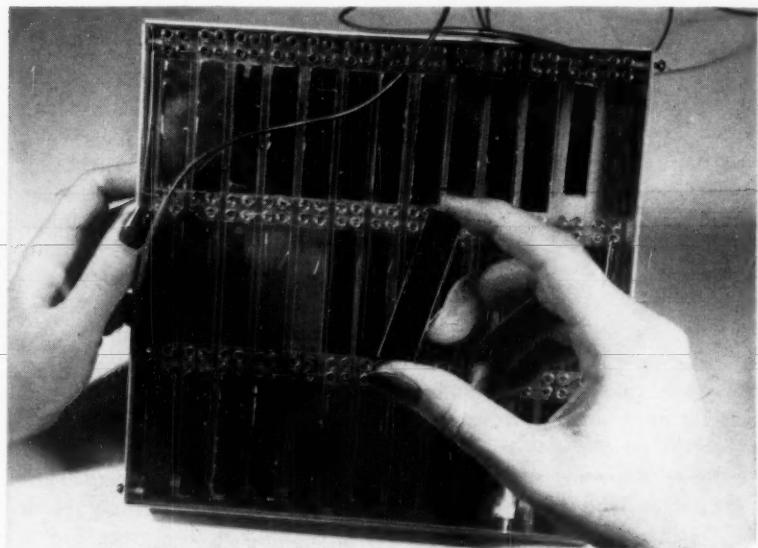
cost cooking stove now being built for use in India in areas where ordinary fuels are scarce and expensive.

The second method for direct use of solar energy is by *collection*, rather than concentration. Here, the sun's energy is picked up as it comes—by one of several types of flat plate collectors spread out for the purpose. In this category are the "hothouse" type power stations which have recently been the subject of much discussion and doodling, and a number of photoelectric and thermoelectric devices.

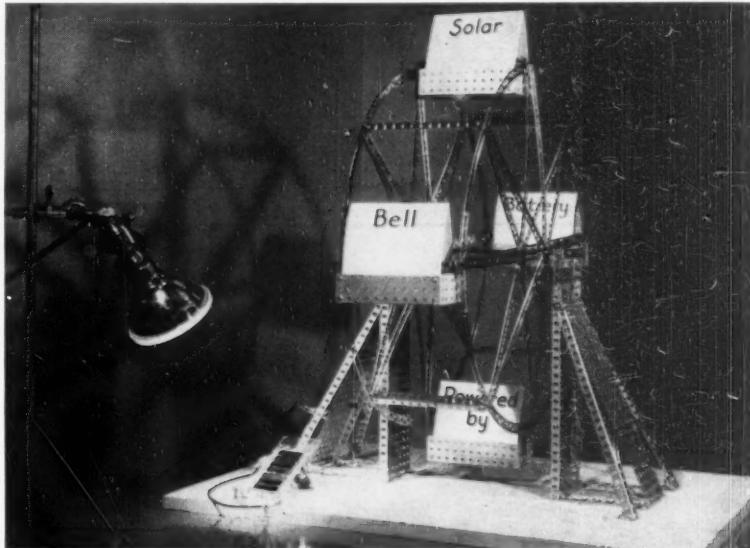
The hothouse type of power plant would consist basically of a large number of glass-roofed collection cells, looking much like a greenhouse. On the floor of each cell there would be a blackened steel heat-collection plate under which would run a maze of water pipes to take up the captured heat and carry it to the generating station.

This system is fairly straightforward, but it raises many problems:

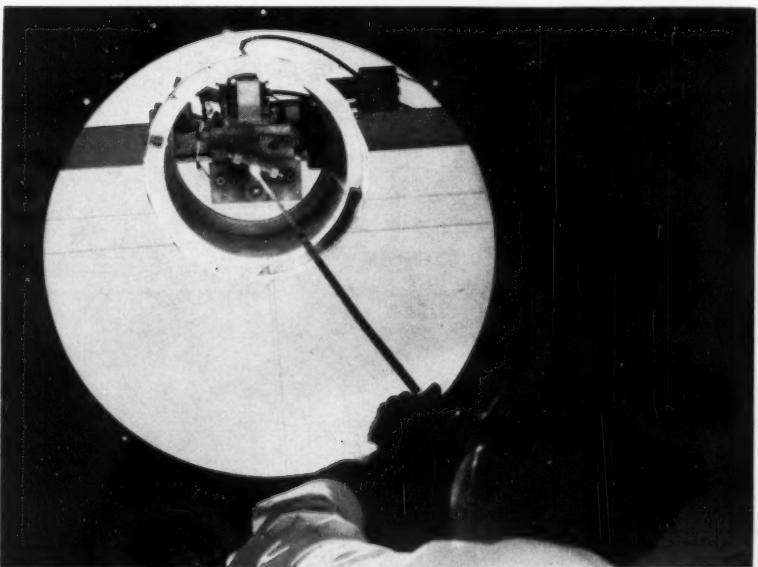
To collect enough heat for a 10,000-kilowatt power plant, the cells would have to be spread over 40 or 50 acres. The investment in land alone would be considerable, and construction costs would not be low. Auxiliary power plants or energy-storage facilities would be needed to provide for long



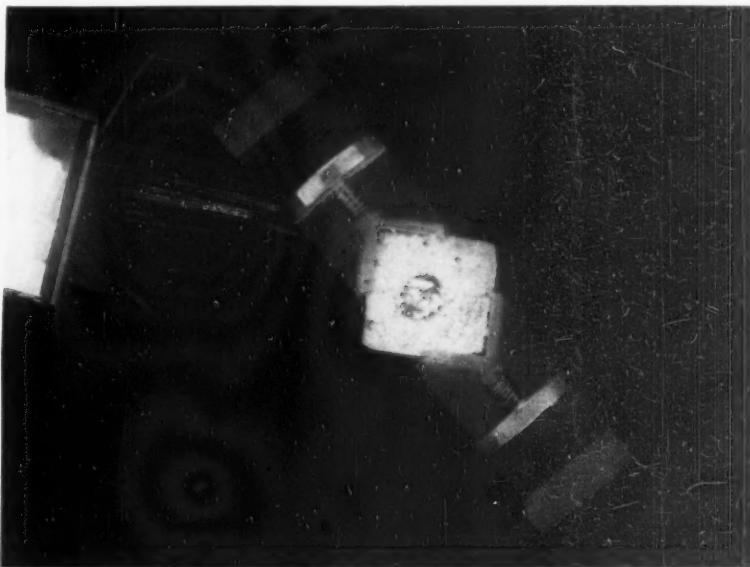
Silicon strips like the one held here can be linked in series to build solar battery of desired size. This assembly would deliver nearly a watt. Though they do not store current, strips can be made to charge storage cell.



Artificial light, and even diffuse light, will activate high-purity silicon strips. Silicon has several unusual electrical properties, is expected to find other new applications in computers, switching elements, transistors.



White heat is reached in seconds by steel rod held at focal point of Convair furnace. Design of unit permits full visibility of heating area, permits control of temperature by metal shade. Metal jaws hold specimens.



Ceramic melts under intense heat of solar furnace. Molten spot at center of test piece shows size of focal point. Theoretical temperature limit is 10,000°, but atmospheric haze, mechanical problems prevent reaching it.

sunless periods. In northern climates, there would be an added expense in protecting the pipes against unusually low temperatures that might freeze the water and gum up the whole works. And, even if the water were kept under pressure, the top operating temperature could not be much over 250° fahrenheit.

These latter limitations, at least, do not apply to the third major method of using solar energy—*direct conversion* of solar energy into electricity; or to methods which combine collection with conversion. For instance, if a thermopile is connected to the underside of a blackened collection plate, the heat absorbed by the plate will cause an electrical current to flow across the junction of the wires, and this current can be used to operate standard electrical devices. (A thermopile is made by joining wires of dissimilar metals at two points in a closed circuit. When a temperature differential is maintained between the two junction points, a current will flow through the circuit.)

Thermopile units built at MIT have been made to operate at efficiencies as high as 7 per cent—but only when the thermopile junctions were kept at temperatures above 600° fahrenheit.

Another electrical approach involves use of a photovoltaic cell. According to George R. Harrison, Dean of the MIT School of Science, "a cell of selenium or copper oxide may convert as much as 12 per cent of the energy it receives into electrical power . . . [but] only about a third of this power can be drawn off by an external circuit," so that over-all efficiency is only about 4 per cent.

In view of these figures, the new Bell Labs' "solar battery," which converts solar energy directly into electrical energy, looks very good indeed. According to Bell Labs scientists, thin strips of light-sensitive silicon metal can achieve an over-all efficiency as high as 6 per cent—and there is reason to believe that "this efficiency can

be improved substantially."

For applications where relatively small amounts of power are required—as, for instance, in repeaters for rural telephone systems—the new silicon device may well be an immediate answer to a long-time problem. And, some day, this type of device may even prove practical for large-scale power generation.

Silicon metal is by no means the only new material under test. Recently, for instance, the Air Research and Development Command revealed that its engineers at Wright Field have been testing cadmium sulfide crystals, and have obtained encouraging results.

It is interesting to compare converters of this type with a hothouse collector:

Silicon strips, BTL says, will deliver power at the rate of 50 watts per square yard of surface in full sunlight. On this basis, a 10,000-kilowatt plant would require about 40 acres. That is just about the same as the hothouse type. However, it should prove a lot easier and cheaper to run electrical wires around a 40-acre plot than to set up a heat-transfer system.

The cost of such an installation is difficult to predict. But silicon is an abundant element, and silicon metal is relatively inexpensive.

Last, but by no means least, are the *indirect*, or photochemical, means for converting sunlight into useful energy. Many of these involve, simply, increasing the effectiveness of natural processes like photosynthesis and evaporation.

In photosynthesis solar energy is converted into chemical energy through the medium of living plants. Sunlight, acting on the green pigment, chlorophyll, in plants makes it possible for them to produce the chemical compounds which we use as food and fuel.

By choosing certain kinds of plants—specifically algae—which do this very rapidly and which are adaptable to chemical processing techniques, it seems entirely possible to grow vast

amounts of material in chemical "farms," and treat it on a continuous basis to produce food, fuel, and industrial raw materials (see photograph below).

Another natural process receiving a lot of attention is evaporation of sea water—both as a potential source of water for irrigation and as a means of obtaining such useful elements as magnesium, bromine, and gold.

At the University of California, three types of experimental units are under study:

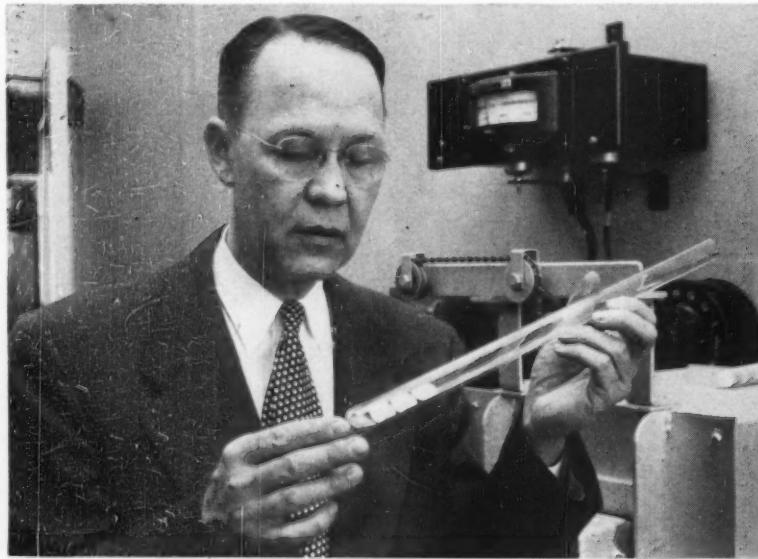
One is a solar distiller which uses a flat plate collector.

The second is a thermal-difference combined power-plant-and-still that is, in effect, a type of heat-exchanger or heat pump which operates on the relatively small temperature difference between warm sea water and somewhat cooler fresh water or deep sea water.

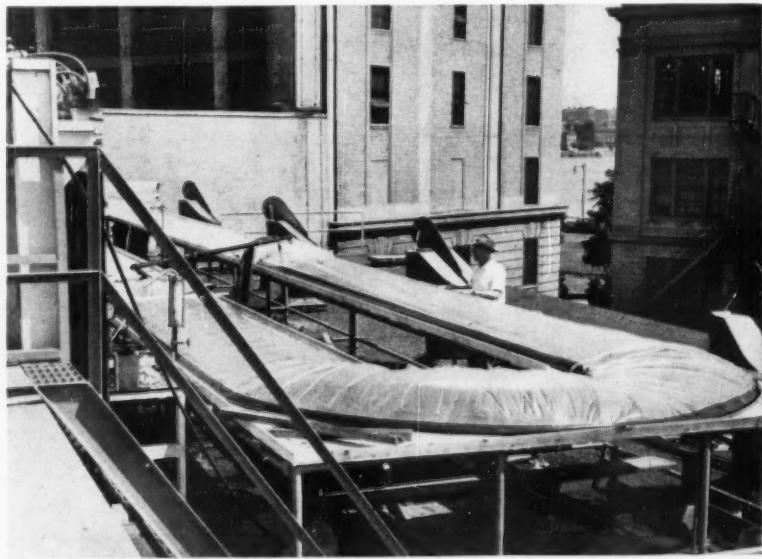
The third is a triple-effect distiller designed to utilize waste heat from a Diesel engine. All three still pose many problems in practical design, as Everett D. Howe of the U of C's College of Engineering points out, though.

The University of California is also working on a photosynthetic method of growing algae for animal feed and treating sewage at the same time. This does away with the need for "feeding" the algae, supplies oxygen for decomposition of the sewage, and, says the U of C, "embodies the most efficient use of the sun's energy so far made." University scientists believe this technique has possibilities for treatment of industrial wastes, too.

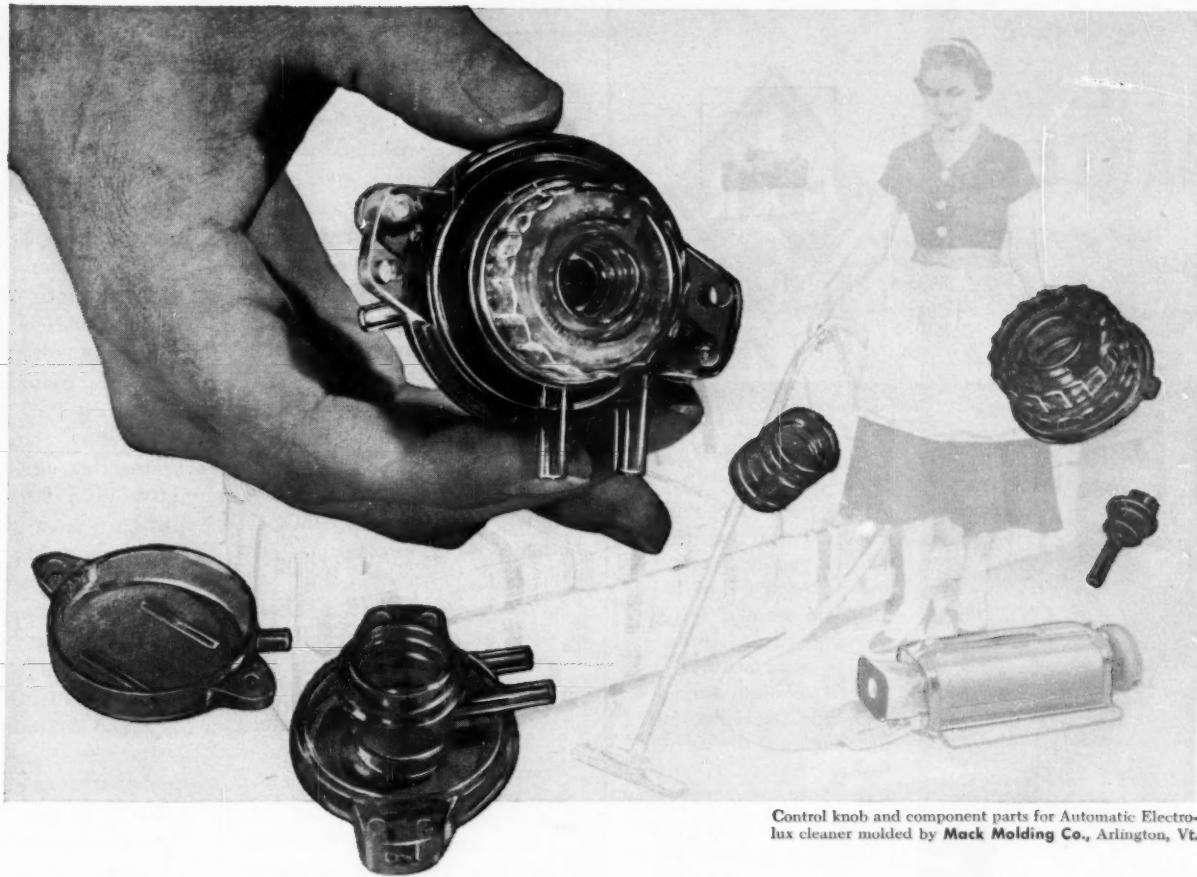
Other photochemical means for putting solar energy to work are also being considered. Harrison reports experiments in Palestine which show that addition of a harmless green dye to sea water will speed evaporation and salt production by as much as 30 per cent. L. J. Heidt of MIT finds cerium salts dissolved in water will, when the water is exposed to solar radiation, pro-



Electronics is one of many fields contributing to solar energy progress. Need for new transistor materials spurred Bell Labs' research on silicon, led to processing method pictured here which fits it for solar battery.



Plastics, too, are pressed into service to meet solar energy needs. Researchers at Arthur D. Little, Inc., use translucent Bakelite polyethylene tubes to contain, protect algae in roof-top photosynthesis pilot plant.



Control knob and component parts for Automatic Electrolux cleaner molded by **Mack Molding Co., Arlington, Vt.**

PLASTIC DIAL TUNES IN A NEW SELLING POINT

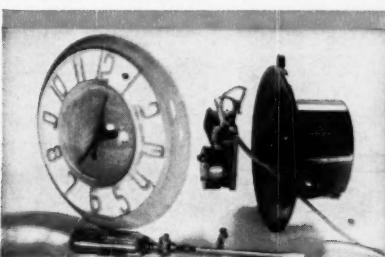
You turn this plastic dial knob on the new Automatic Electrolux vacuum cleaner to adjust the cleaner for the dirt condition of the locality in which it is to be used. When collected dirt threatens to lessen air flow, an automatic "brain" stops the motor and ejects the paper dust bag, sealed and sanitary. Put in a new self-sealing bag, and the cleaner runs with full power.

The knob and its component parts that set the automatic "brain" are molded from BAKELITE C-11 Plastic, an acrylonitrile-styrene copolymer. This plastic has good impact strength, with-

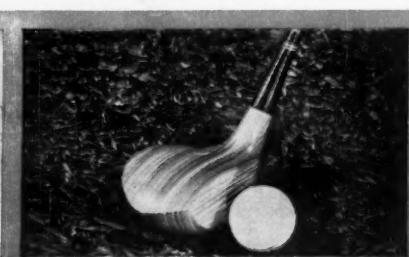
stands heat, and is resistant to oil and most chemicals.

BAKELITE C-11 Plastics are readily molded into intricate, accurate working parts. Their dimensional stability is excellent. They can be sawed, milled, drilled, tapped. They have excellent resistance to soaps, detergents, most acids, alkalies, foods, and fruit stains.

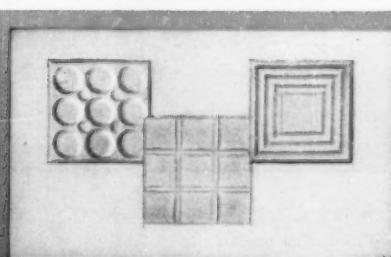
That's why so many industrial and consumer items can be improved in design, sales and service through their use. Learn how they can fit your product by writing Dept. XP-15.



FACE AND COVER for electric clock are BAKELITE C-11 Plastic, an acrylonitrile-styrene copolymer. Finely detailed, tough, brilliantly colored, they combine structural and decorative functions. Molded by Telechron Dept. of General Electric Co., Ashland, Mass.



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TRANSLUCENT CEILINGS made from these formed BAKELITE Rigid Vinyl Sheet panels are suspended below fluorescent fixtures, diffusing glareless light throughout room. Light weight permits easy removal for cleaning. Made by Daylight Ceiling Co., San Francisco 7, Calif.

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mote separation of water molecules into hydrogen and oxygen, permitting their separate use. So far, though, operating efficiency is not very high.

Still another chemical conversion method was used by Dr. Maria Telkes in constructing her "solar house." Glauber's salt (sodium sulfate), when heated above 90° fahrenheit absorbs and stores energy, releasing it when the temperature falls below that point. Twenty tons of canned salts built into a wall of this house absorb and store enough energy to take care of most of its heating needs.

So much for what has been done. What is ahead?

Perhaps the greatest hope for progress in solar energy is the similarity of its problems to those of another power source—atomic energy.

As Walter F. Friend of Ebasco Services, Inc., points out, solar and atomic radiation are basically similar. The problems in energy conversion and heat transfer are much alike. So, there is every reason to expect that much of the technology being developed for atomic energy will help to advance solar energy. (This common ground is not an unmixed blessing, however. It encourages research, but also sets up some blank walls of secrecy that screen solar as well as atomic knowledge.)

Increasing interest in heat pumps is also helping to spur solar energy research. (Heat pumps are devices designed to take advantage of the ability of electric power to make heat flow "uphill"—from a relatively cool source like the earth or well-water to the warm interior of a building—providing additional heat where it is needed.)

Heat pumps have many desirable characteristics. But, as W. F. Friend notes, in their present stage of development, they put heavy loads on electric power systems during extremely cold weather.

A combination of a "sun motor" and a heat pump, or the direct use of solar energy as a heat source, might well make the latter a good deal more attractive from the operating cost standpoint.

Solar energy is not likely to be a major source of industrial power within the next five years—or even the next fifteen years.

Still, a good many leading sci-

tists, among them James B. Conant, former president of Harvard University, believe that solar energy will be the dominating factor in industrial power production by the end of this century. It may well have to be. Supplies of other fuels—including uranium—are to-day being used up at a reckless rate. A new and abundant energy source for the future is badly needed; and sun power is the obvious answer.

An indication of the potential market in solar energy—if it can be harnessed—is a statement by Palmer Putnam in the report of the President's Materials Policy Commission: By 1975, he says, the market for solar comfort heating (assuming that units can be built for \$2,000 to \$3,000) could well be thirteen million installations, representing about 10 per cent of the national energy system.

There is good reason to expect that solar energy will find practical application well before 1975 in such devices as battery-chargers for rural telephone amplifier stations and low-power mobile equipment, in specialized metallurgical furnaces, and perhaps as a means for promoting chemical reactions.

It is not too early for companies which make materials and products that might be useful in connection with solar energy (and that includes everything from metal pipe and electrical wiring to plastic sheeting) to investigate the field.

A good deal of information may be had from such technical groups as the American Society of Heating & Ventilating Engineers, and from the many research organizations which are now working on solar energy problems. These include Stanford Research Institute, Arthur D. Little, Inc., Massachusetts Institute of Technology, and the Universities of California, Texas, and Wisconsin.

An Association for Applied Solar Energy has just been formed, and plans are under way for its First World Symposium. This is scheduled to be held in Phoenix, Ariz., next January 12 to 15. Stanford Research Institute, Palo Alto, Cal., is handling the arrangements.

Sun power has been a long time in coming. But it's moving forward to-day. The smart company will get ready now to use it, and sell to it, when it arrives.

THE END

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Business thriving... swell statement, but... out of "working money"

THE EKS COMPANY was going great guns... product selling well, and at a good profit, too... salesmen opening up new markets, adding good accounts.

Adding *too many* accounts, as a matter of fact, because the volume of business was far outstripping the working capital. Too much money was tied up in receivables and inventory. Not enough "working money" was available to discount suppliers' bills, buy needed new equipment, and meet growing payrolls.

IN A CASE like this, what's the remedy? Suppose it were your company. Would you slow down production, refuse new orders, sacrifice growth and income possibilities?

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tailored to order for such situations. It is a streamlined combination of banking and borrowing, modernized and polished to fit every financial need of modern business in practically every field. It could be just what you need if your business is being held back for lack of working capital.

OUR SERVICE is probably most effective for companies with sales volume of \$500,000 or more annually, but can be tailored to help smaller businesses with definite growth possibilities.

It gives all the helpful cooperation needed without any meddling or messing with management. It simplifies the routine of payment and deposit, and eliminates a lot of bookkeeping detail.

Don't you think you should give it some serious thought... investigate... find out what it is and see how it might work to your advantage? Even if you don't actually need our type of banking service now, there may come a day!

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Financing Leading Firms in Many Fields of Industry
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3. Harmonizes Credit-Sales relations.
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13. Helps avoid secondary credit costs.
14. Creates an adequate bad debt reserve.

For booklet, write Dept. 50, First National Bank Bldg., Baltimore 2, Md.

American Credit Indemnity Company of New York

HOME-GROWN

Continued from page 31

We at Lehn & Fink faced this problem just as every other firm must. We have outstanding men in our research, production, product control, and other departments and we have made every effort to bring them in on the entire operation of our corporation.

We faced up to this problem and believe we have come up with the right answer in a simple, extra-curricular group called HOCO for "How Our Company Operates." It is designed to indoctrinate selected young executives from all departments in just how our company operates and bring them together in fraternal spirit of joint study and activity to fully integrate in the organization for which they work.

This simple HOCO plan we organized in March 1953 seems to fill the bill, and I anticipate that our company leaders will come from the men in this and future HOCO groups.

Well, what is "How Our Company Operates" at Lehn & Fink? It is a small group of what we call the "middle-management" personnel who meet regularly to study all phases of the corporation's operations; work out recommendations to various sections in a "problem-solving" program; visit the various sections of the home physical plant and those other plants with which we deal and which affect our business; enjoy the fraternity of colleagues from all departments and meet top executives in the company; and develop any programs which the members feel will be of benefit.

HOCO is learning—a workshop that will enhance the future of the individual and the firm.

HOCO is doing—through the instigation of the middle-management group itself—and is operated solely by its members. Their programs are entirely their own. They are given a small budget; for dinners, speakers, travel, and the whole-hearted co-operation of our entire organization—and they go to it!

When this plan was formed in March of last year, nineteen men were named by the various department heads, with thirteen finally selected to make up the initial group.

The only specific restrictions to membership are that 40 years is the



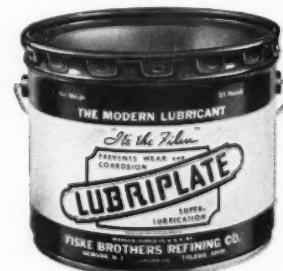
FORWARD!
by

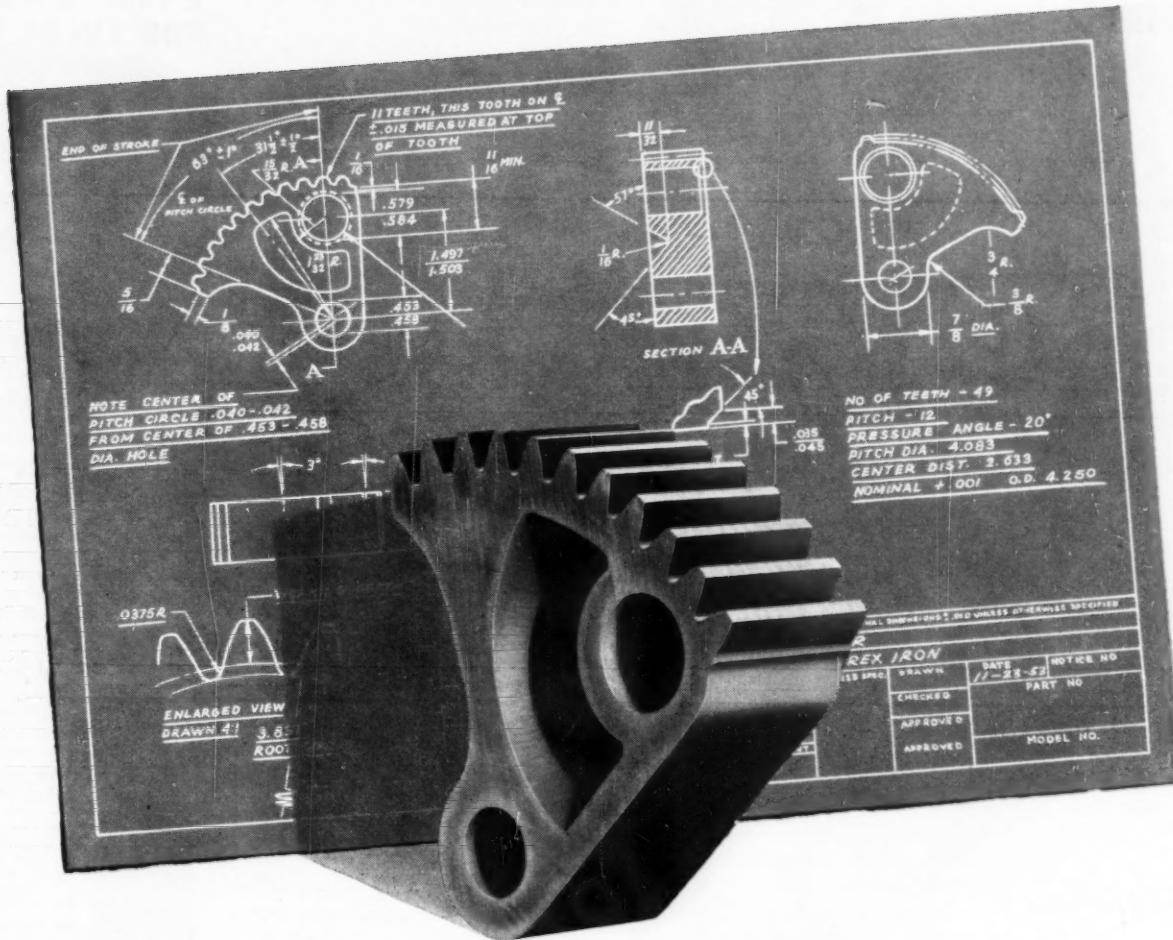
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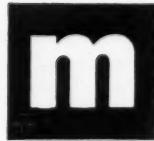
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By conventional casting and machining methods, this part would be high in cost and would require extensive equipment investment. Through the use of metal powder techniques, it has been mass-produced with important over-all savings.

Note the construction details on the print in the background. Formerly many machining processes were necessary before this part was ready to be assembled into a

complete, operating mechanism. Now it comes from a press complete in a single operation . . . another example of what can be accomplished through cooperative effort between customer and Moraine.

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We say that Olympic brief cases are SCUFF-PROOF for all practical purposes. Of course, we do not claim that the heavy grade of ageless vinyl plastic from which Olympic cases are fabricated will withstand augers, drills or hacksaws. But we know that Olympic cases have travelled as much as 100,000 miles and still have that new look.

We invite you to see for yourself. Send in the coupon with one of your firm's letterheads, and we'll send you a 16" under-arm "zipper" case or a 16" brief case in our handsome brown alligator grain for a 30-day trial. If scuff-marks show up, we'd like to know how.

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Manufacturers of a Complete Line of
Ladies' and Men's Fine Luggage

OLYMPIC LUGGAGE CORP.
Kane, Pennsylvania

age ceiling, and candidates must be only those for whom it is expected there is a future position of high-level authority and responsibility within the company.

HOCO membership includes assistants and managers from the purchasing, credit, engineering, merchandising, labor relations, finance, administrative, and sales departments. That gives an idea of what we consider the vital "middle-management" group for our better top-executive prospects.

The members meet in New York, but come from all parts of the organization, and all meetings are held after office hours.

The first monthly sessions were devoted exclusively to a series of presentations by division heads giving detailed graphic outlines and detailed explanations of their departments—both as unit operations and as an integral part of the company. This phase originally conceived for monthly meetings proved too drawn out to satisfy the high-interest level of its members and they decided to hold a two-day seminar of concentrated reindoctrination so that monthly meetings would take up company problems and the development of specific recommendations to them.

You see, in addition to the major advantages of their being introduced into the over-all corporate policy and thinking, HOCO is called upon to justify its existence by specific contributions to over-all management objectives. So study projects in which small groups of HOCO members work together in a problem-solving capacity, are aimed at aiding various departments with ideas and approaches to standard operating problems.

These recommendations are submitted to the entire group and, if approved, move on to the Executive Committee. There have been four major problems presented for solutions by HOCO work groups. These four were:

1. Determination of an improved method of establishing ratios which will enable the company to market products at a reasonable profit.

2. A plan for better co-ordination of the efforts of purchasing, sales, and production departments in establishing and meeting release dates on both staple and promotional merchandise in the most efficient and economical manner.

3. A reappraisal of sales personnel qualifications and of an effective method for selection, motivation, and retention.

4. A study and an analysis of a plan for the reduction and improvement of intercompany forms and records.

Business men everywhere will recognize that these four are major problems and their solution represents a sizable gain for the company, and tremendous experience in corporate management for those working out such solutions. Specific recommendations for the first two are already under consideration by the departments involved and by the executive committee.

One of the most important phases to the HOCO member's preparation for top-management responsibility is first-hand inspections of actual operations. Here the specialist gets to see what the other fellow is really doing. Chemists tour sales departments and credit men visit our production shops, and, needless to say, all benefit with a better picture of the company's over-all operations.

After one year's operation we have a better idea of what HOCO can do and is doing. It, of course, has limitations—but I'd hate to spell these out and be immediately contradicted by the ingenuity and energy of the members themselves. I'm often asked, though, what is HOCO accomplishing? I see five major points as its outstanding contributions to date:

1. Aiding the development of well-rounded future top-executive leadership.

2. Helping to formulate solutions to various company problems and offer new ideas to various departments.

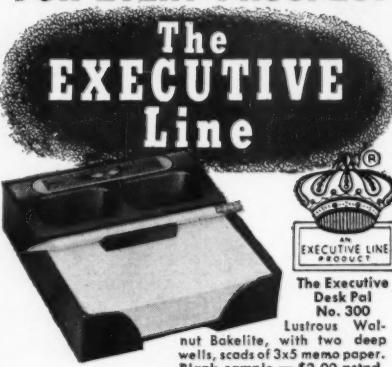
3. Integrating specialists from one department into the work of another department so that they will better do their present jobs through an understanding of the over-all company operation.

4. Giving middle-management people from the various departments the opportunity for fraternal "face-to-face" contact with other department executives, so that they may be better able to work with each other.

5. Fostering a wonderful "esprit de corps" among HOCO members that is adding new zest to the entire organization.

There are several unique factors

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"Many of the declines in business could have been prevented by efficient salesmanship," reports Dun's. ONE proven way to make selling more efficient — to remind both customers and prospects of you and your products every hour of the day — is through an Executive Line Advertising Specialty or Business Gift.

Every Executive Line item STAYS on a desk, or in a pocket, because its recipient is sure to find it extra valuable, extra useful, extra long-lasting. An Executive Line Specialty, with your name, slogan or trademark on it, serves as both a good will ambassador and a tireless "second salesman."

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NOVEL PAPERWEIGHTS • CALENDARS
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Stainless Steel

Handle — folding 8" ruler, a mm. measure and a protractor. Back, a decimal equivalent table and reduction scale. Sample — \$2.50 pspd

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It's NOT just a Pocket Calendar, but an easy-to-operate Calendar that is good for 22 years, combined with a beautiful Bill Clip. Calendar's black enamel lettering deeply etched into the metal, contrasts with the polished stainless steel. Sample — \$1.50 pspd.

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involved in the operation of HOCO. I believe they all constitute advantages.

* The entire program stemmed from the expressed desire of the young men to acquire deeper knowledge of the company and its operation.

* It is conducted by the men themselves.

* HOCO starts men on the way to leadership while they are still young in age and in years with the organization.

* HOCO is designed for men already established in the company, while most personnel development programs are aimed at newcomers.

* HOCO men were introduced to the Board of Directors at their recent two-day seminar and are often in personal contact with the top leaders of their organization. Here is an idea neglected by many companies. How many junior executives have met the Board members personally? I believe there are definite advantages for them to come into face-to-face contact with the men whose policies they are entrusted to carry out.

* HOCO eliminates front-office favoritism and politics from the selection of the field of potential top management.

* HOCO activities are investigative in purpose. There are no pre-arranged problems and answers. The members bring their own "headaches" into the meeting for analysis and solution.

* HOCO is a laboratory as well as a training ground and forum.

* HOCO is a very simple plan. In its simplicity may possibly lie its greatest virtue. It gives its members complete leeway and relies for success upon the capacities for development of those outstanding prospects which have been chosen from all departments as its members and our potential leaders. My confidence in their capacities is unbounding.

I know the men in HOCO. They are the type we want to lead our corporation. They are the kind I'd like to see pick up the ball and run with it. These men are the kind we all feel confident will be able to successfully guide the future progress of the corporation.

They need a background in our over-all operation and are getting it. They are specialists—acquiring a broad indoctrination in an active

and positive way and meeting the men with whom they will be working in the years to come as well as present company management.

Perhaps the greatest single advantage of the HOCO program to the corporate enterprise is the opportunity HOCO presents to our executives to see a junior "in action" before a costly and time-consuming job change is made a part of our operating procedure.

For example. There are four universally accepted personal traits which I recognize as being essentially a part of what we look for in selecting executives. Judgment, organizing and planning skill, per-



The AUTHOR

Edward Plaut follows in the footsteps of his father and uncle as president of Lehn & Fink Products Corporation. Determined to know more about the business as a young man, he majored in chemistry at Princeton and Columbia Universities, gaining his Ph. D. in organic chemistry.

Mr. Plaut became president in 1921, but even prior to that his ideas for executive training had been incorporated in company policy. While he has spent a great deal of time in travel, he has managed to maintain both his far-sighted leadership of the company and a great many outside activities in the commercial and academic fields.

suasive skill, and, finally, industriousness. The degree of a person's command of these basic work habits will go a long way in paving a career for him. Too often, however, I have found a serious lack of opportunities for ascertaining whether or not a young, coming executive has these basic traits before he goes into new job responsibilities. I believe HOCO now gives me that opportunity to observe the young executive "in action."

Again, HOCO provides us with a yardstick to measure potentials and to prevent an untimely move up the ladder. The method of trial and error is eliminated.

After one year's operation HOCO seems to be exceptionally well suited to handling our needs. I am very well satisfied with it; and, most important, the men who instituted and are running it seem to be happy with it. As long as the men involved maintain a genuine interest, it will continue to be a great success.

THE END

THAT'S FOR ME! A FREE BOOKLET OF IDEAS FOR PEOPLE WHO USE OFFSET DUPLICATING MACHINES



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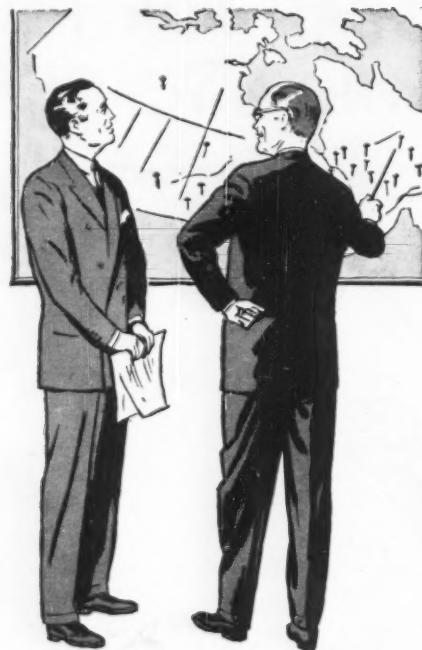
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MOTIVATION

Continued from page 33

influence their purchases and can be measured.

This is a striking departure from that large segment of economic theory which holds that consumption is a passive function and that business and government together exercise the dominant role in business cycle fluctuations—that, in other words, millions of consumers just tag along.

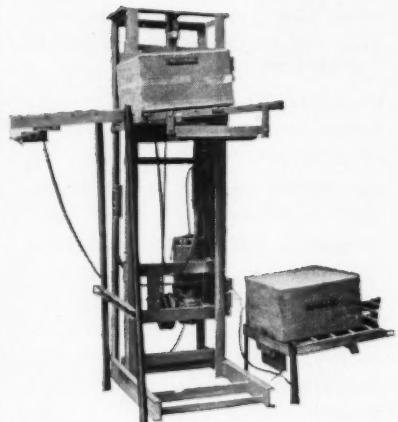
For management, however, it's the non-theoretic aspect of these attitude studies that is most important. If the surveys, headed by George Katona, show that consumer attitudes toward future spending are reliable barometers of actual performance, then large sectors of industry will have a new tool to add to their sales forecasting techniques. The Center uses probability samples and pioneered in quantifying open-ended interviews, which in the CMR field places them roughly midway between Gallup and the depth interviewers.

Where is consumer motivation research going from here? The consensus of opinion in the organizations doing the work is that the "battle of statistics" (sampling criticisms) is just about over. From here on, the problem of the trade will be one of competing techniques with one group emphasizing word association tests, another placing stress on class or environmental research, another on observational techniques, and so on. But they see the areas of research as almost unlimited. One group is planning research into motivations behind objections encountered in direct selling. New product development is another area CMR is expanding into. The particular motivations of the growing middle-aged market is still another. One research group thinks that labor relations is wide open for motivational studies. Stockholder relations is another possibility. The attitude of most CMR organizations is summed up by the comment made by Ernest Dichter, one of the earliest entrants into the field: "Wherever one group wants to communicate with another, however it is done, and whenever the question why is asked regarding people, we fill an important need."

THE END

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ELEVATORS
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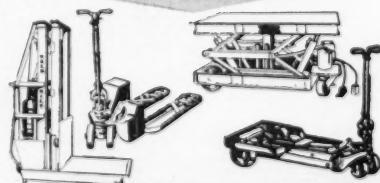


One of three Weld-Bilt elevators
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Here's a great time and man-saver where production flow demands *multiple-level* conveyor systems . . . It's a new Weld-Bilt development in AUTOMATIC Conveyor-Lift Elevators. Lifts or lowers packages or parts from one level to another, automatically selecting and lifting certain packages, passing others, if desired. Power rollers on lifting platform move load off in any required direction. All this is done without manual attention, to keep your production moving swiftly, without interruption.

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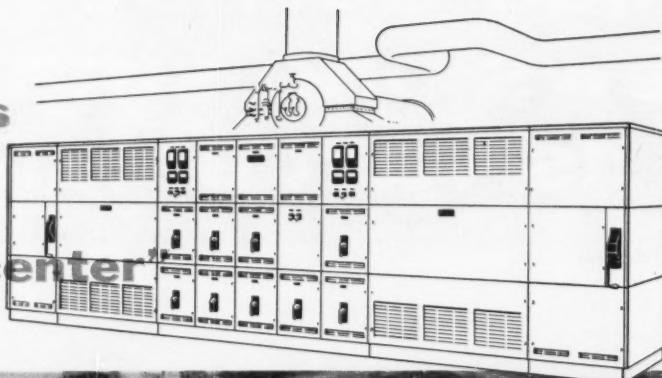
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an extensive electrical system, capable of supplying electricity for 25,000 homes, breathes life into a gigantic, ultra-modern shopping wonderland.

ELEVEN I-T-E Unit Substations, channelling electricity throughout this sprawling market place, service the tremendous lighting and power requirements of the Center's big Hudson Building and 80 busy stores. Substations are strategically located to provide maximum protection, control, and continuity of service.

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- *Unemployment declines again*
- *Construction reaches new peaks*
- *Output fails to fall as usual*
- *Inventories still slipping*
- *Shopping slightly below record*

Highly Seasoned?

How many swallows make a Summer? How many seasonal rises make a trend? This doubtless was the puzzlement mildly distressing many close observers of the American business scene as 1954's first half drew to a close. For the most recent reports from many segments of the economy seemed to indicate that the recession had receded behind a mist of seasonal improvements. Whether the returning robustness could be traced to Spring fervor, Indo-China indecision, or the welcome resumption of long-term growth was a conjecture about which the available data offered meager clues.

Since consumer spending in May and early June held close to the high level of a year ago, and since industrial production was down perceptibly from the near-peak of a year ago, there seemed little doubt that the rate of inventory reduction was faster than in the first few months of 1954.

At the beginning of May, total business inventories remained slightly higher than a year ago with the largest yearly swelling on the wholesale level. Current efforts to pare stocks continued to be most strenuous among manufacturers of durables. Consequently, the latest stock-sales ratio was perceptibly decreased from the level of last Fall when the retrenchment became noticeable.

Widely characterized as an "inventory recession," the 1953-1954 adjustment has been apparently just that, for practically all of the decline in gross national product—the total value of the goods and services produced—has resulted from the shift in inventories. Of course, defense spending cuts also contributed to the letdown. Invertebrate optimists will most likely consider the levelling off of business at present levels an undeniable signal of the end of the recession, while persistent pessimists will be satisfied with nothing short of a return to the heady heights of 1953. Of course, not merely pessimists but many others cognizant of population growth and productivity increases will be difficult to please this side of superbooms.

Placid Prices

One of the most pleasantly perplexing aspects of the current business decline has been the stolidity of prices. Placid as an aged tortoise, prices have nudged along at virtually the same levels during the decline in general business—a rather prodigious performance. While the torpid firmness of prices may be an important



The Trend of BUSINESS

DEVANEY PHOTOGRAPH

source of confidence to many business men and thus aid recovery, there is also the distinct disadvantage of lost markets through needless rigidity. That some prices were at least not torpid, but were skidding downward like harried hares seemed evident from the *contres* in some retailing circles over discounters and "bootleggers."

Other segments of business joined construction in May in offering hope and sustenance to those seeking a return to the promised land of ever-increasing volumes. The steel industry, which suffered the most severe shock—a drop

of 30 per cent in production—during the recent business pause, increased steadily in output for five weeks through May and early June. With steel inventories much less burdensome than a few months ago and the threat of a strike, steel buyers were less reluctant to extend their commitments than they were a few months ago. Operations were widely expected to continue at slightly more than 70 per cent of capacity well into July. There were scant signs of the possibility of using the excess capacity unless defense requirements were increased suddenly and substantially. On the New York Stock market, steel stocks were among the pacemakers in the steady rise during May.

Fewer Jobless, But . . .

Although more people were at work in May than in any month since last Fall, the rise of a half-million in employment was somewhat less than usual for this time of the year. During the past five years, the May rise in jobs averaged almost a million. The expansion in total jobs in May obscured the continued decline in factory employment which dropped nearly 200,000, continuing the steady shrinkage of the last nine months.

While total employment was off only a half-million from May 1953, about three times that many factory jobs vanished during the same period, as inventory trimming, and defense cutbacks combined to reduce payrolls. The year-to-year drop in total jobs was lessened by the rise in construction, services, and farm work. Most of the decline in factory jobs continued to be in durables, particularly in transportation equipment and machinery. However, the dip in May was not unexpected for the production of both durables and soft goods usually declines in

Weekly Business Signposts

SELECTED BUSINESS INDICATORS	LATEST WEEK*	PREVIOUS WEEK	YEAR AGO
Steel Ingot Production Ten Thousand Tons	173	173	218
Bituminous Coal Mined Hundred Thousand Tons	756	646	923
Automobile Production Thousand Cars and Trucks	135	134	159
Electric Power Output Ten Million K.W. Hours	885	867	833
Freight Carloadings Thousand Cars	698	612	797
Department Store Sales Index Number (1947-1949=100)	111	97	112
Wholesale Prices Index Number (1947-1949=100)	110	111	109
Bank Clearings Hundred Million Dollars	861	790	909
Money in Circulation Hundred Million Dollars	298	299	300
Business Failures Number of Failures	207	206	167

*Steel data are for the fourth week of June; all others are for the second week except autos, electric, and failures which are for the third.

Sources: Amer. Iron & Steel Inst.; U. S. Bureau of Mines; Automotive News; Edison Electric Inst.; Amer. Assoc. of Railroads; U. S. Bureau of Labor Statistics; DUN & BRADSTREET, INC.

*inexpensive
MECHANICAL MUSCLES*

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Light Duty Lifting

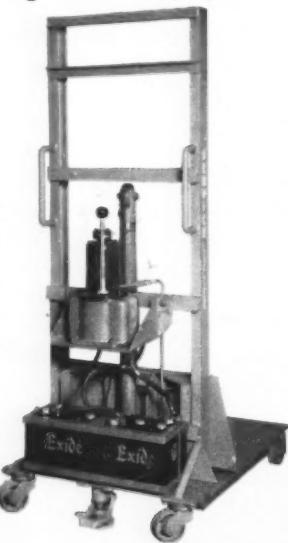
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JUNIOR LIFTERS**

For loads too heavy for a man, too light for expensive, heavy-duty lifting equipment.

Service Battery-Powered JUNIOR LIFTERS easily, quickly and safely handle those light-duty lifting jobs—barrels, crates, cartons, materials—avoiding tie-up of your expensive, heavy lifting equipment. Ideal for receiving, shipping, storage and intra-plant materials handling. Move on easy-rolling Forgeweld Casters and Wheels.

JUNIOR LIFTERS are available in fast-acting, free-to-roam battery-hydraulic models, with a capacity of 500 lbs.—no power lines or cords to drag or restrict maneuverability. Rate of lift 15 feet per min. Standard dimensions*: lift 4'8"; platform size 30" x 30" square; max. width 30"; overall height 6'0". Write today for circular No. 430.

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Battery Powered JUNIOR LIFTER is fast operating . . . can be used anywhere. Note in lower photo how easily one man controls operations.



CORPORATION
announces the purchase
of the facilities of
**SERVICE CASTER
& TRUCK CORP.**
of Albion, Michigan

THE COLSON CORPORATION
ELYRIA, OHIO

CASTERS AND INDUSTRIAL MATERIALS-HANDLING PRODUCTS

*The Trend of
BUSINESS*

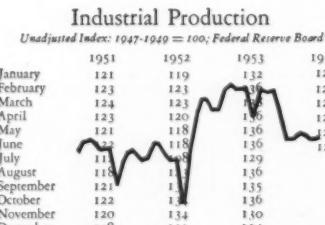
that month. Jobs in apparel and chemical manufacturing dipped slightly more than usual. The steady attrition in factory jobs appeared over in most sections of the nation. The Bureau of Employment Security reported that manufacturers' hiring plans as revealed to local public employment offices in areas indicated no significant change in payrolls in the months to come.

In June claims for unemployment insurance benefits fell to the lowest level since last January. However, this was not especially heartening since many jobless workers, whose benefits have been exhausted, aren't counted. The ranks of the long-time jobless (out of work for fifteen weeks or more) didn't thin in May, instead held at about one million. The number working part-time for economic reasons in May was 1.5 million, the same as six months ago.

While unemployment didn't decline in May as much as had been hoped, the drop of 160,000 was perceptibly larger than the average

during the past five years. At 3.2 million, joblessness accounted for 5.1 per cent of the labor force in May, the lowest level in four months; during the 1949 recession unemployment averaged 5.5 per cent of the labor force. Unemployment in June was most likely close to four million, due to the entrance of many new graduates into the labor force.

The list of distressed areas (employment centers with at least 6 per cent of the labor force without jobs) lengthened considerably during the month. The addition of sixteen areas—most in Pennsylvania, New York, and Illinois—brought the total of such areas to 51. This was about one-third of the nation's total of 149 major areas. There was no area with a labor shortage, only sixteen with a balanced labor supply, and 82 with moderate labor surpluses. Of the 51 distressed areas, seven, including Providence, R. I., and Lawrence, Mass., reported that at least 12 per cent of their workers were unable to find employment. Among the



[†]Approximation; figure from quoted source not available.

Wholesale Commodity Prices

Index: 1947-1949 = 100; U. S. Bureau of Labor Statistics

	1951	1952	1953	1954
January	115.0	113.0	109.9	110.9
February	116.5	112.5	109.6	110.5
March	116.5	112.3	110.0	110.5
April	115.3	111.8	109.4	111.1
May	115.9	111.6	109.8	110.8
June	115.1	111.2	109.1	110.2
July	114.2	111.8	109.9	110.9
August	113.7	112.2	110.6	111.5
September	113.4	111.8	111.0	111.8
October	113.7	111.1	110.2	111.2
November	113.6	110.7	109.8	110.1
December	113.5	109.6	110.1	110.1

[†]Approximation; figure from quoted source not available.

Consumers' Price Index

Index: 1947-1949 = 100; U. S. Bureau of Labor Statistics

	1951	1952	1953	1954
January	108.6	113.1	113.9	115.2
February	109.9	112.4	113.4	115.0
March	110.3	112.4	113.6	114.8
April	110.4	112.0	113.0	114.6
May	110.0	113.0	114.0	114.5
June	110.8	113.4	114.5	114.5
July	110.9	114.1	114.7	114.7
August	110.0	114.3	115.0	115.0
September	111.6	114.1	115.2	115.2
October	112.1	114.2	115.4	115.4
November	112.8	114.3	115.0	115.0
December	113.1	114.1	114.9	114.9

[†]Approximation; figure from quoted source not available.

Industrial Stock Prices

Monthly Average of Daily Index: Dow Jones

	1951	1952	1953	1954
January	244.45	271.71	288.47	286.64
February	253.32	265.19	283.04	292.15
March	249.50	264.48	286.79	299.15
April	253.16	262.55	275.28	280.91
May	254.36	261.61	276.84	286.87
June	249.32	268.19	276.87	310.91
July	253.12	270.70	272.26	322.85
August	273.36	272.40	261.80	261.80
September	269.73	267.77	270.73	270.73
October	259.61	270.37	277.09	277.09
November	260.08	285.95	281.15	281.15

Based on closing prices of 30 industrial stocks.

Employment

Millions of Persons: U. S. Bureau of the Census

	1951	1952	1953	1954
January	61.5	61.8	62.4	59.8
February	61.3	61.8	62.7	60.1
March	62.3	61.5	63.1	60.1
April	61.8	61.7	62.8	60.6
May	62.8	62.8	63.0	61.1
June	61.8	64.4	64.7	62.4†
July	64.4	64.2	64.7	64.7
August	64.2	64.0	64.6	64.2
September	63.2	63.7	63.6	63.6
October	63.5	63.1	63.4	63.4
November	63.2	63.6	63.3	63.3
December	62.7	62.9	60.8	62.4†

Includes all civilian workers.

Retail Sales

Billions of Dollars: U. S. Department of Commerce

	1951	1952	1953	1954
January	12.6	11.8	13.0	12.4
February	11.7	11.7	12.3	11.9
March	13.4	12.7	14.0	13.3
April	12.5	13.4	14.2	14.5
May	13.3	14.4	14.7	14.3
June	13.3	13.8	14.6	14.2
July	12.4	13.4	14.1	14.2
August	13.3	13.6	14.2	14.2
September	13.9	14.8	15.0	14.0
October	13.4	14.0	14.0	14.0
November	13.4	16.9	16.4	16.4
December	15.4	16.9	16.4	16.4

[†]Approximation; figure from quoted source not available.

more important additions to the distressed areas list were Philadelphia, Pittsburgh, and St. Louis, where factory lay-offs continued.

Despite the slight decline in the number of jobs in factories and mines in May, industrial production held at the level of the preceding month. This was rather encouraging since total output usually slips in May. However, industrial output at 123 (1947-1949=100) was still down about 10 per cent from the post-war peak. The most pronounced drops from a year ago continued to be in the production of durables, particularly steel and machinery. The final figures for June would most likely show a further slight recovery in total output, reflecting the recent gains in steel, automobiles, and some consumer durables, and the firmness in most soft goods.

The recent decline in the length of the factory work-week was reversed in May, thus helping to account for the steadiness in production while payrolls were cut. The increase of 20 minutes to 39.3 hours and the rise of 1 cent per hour combined to boost weekly earnings to \$71.73, which was down slightly from the peak reached last December.

Personal income in May did not vary markedly from the high level of a year ago as declines in wages, salaries, and farm income were largely offset by rises in unemployment insurance benefits, dividends, and interest. Despite the lay-offs in some sections, consumers were apparently not reluctant to continue spending at a near-record rate. Retail trade in May was up slightly from the prior month and down only 2 per cent from the record level of a year before. In June shopping continued to fall slightly short of a year ago. The most favorable year-to-year comparisons were chalked up by retailers of food and gasoline. Shoppers neglected ap-

parel in May following the strong surge of the prior month. The demand for apparel was off 11 per cent from a year ago, while the sales of furniture and appliances were down 5 per cent. The recent rise in the buying of new cars was mirrored in a slight decline in inventories which were at a record level in the beginning of May.

Construction—the most robust section of the economy—continued to display its reassuring strength as efforts were made to keep pace with the needs of an expanding population. The rise of 10 per cent in May which carried construction volume to a level 4 per cent above a year before was about on a par with seasonal patterns. The most noticeable current gains were in highways, stores, and garages, while the most sizable year-to-year gains were in schools, warehouses, and highways. The most substantial decline was in public housing.

Failures Down Again

Declining in May for the second consecutive month, business failures fell 3 per cent to 943. Despite this dip, casualties were one-third more numerous than last year when 697 occurred and remained above May of any other year since 1942.

The rate of failure, as reflected in Dun's Failure Index, edged up to 41 casualties per 10,000 listed enterprises. The index projects failures to an annual rate and is adjusted for seasonal variations. While this rate did not equal the post-war peak of 44 in March, it was considerably more severe than the 30 recorded a year ago and compared with a pre-war toll of 70 per 10,000 concerns in 1939.

The size as well as the number of failures declined in May. Most of the months' downturn was concentrated among casualties involving losses between \$5,000 and \$25,000. The uptrend from last year's level was mild among very small

BANK CLEARINGS			
	(Thousands of Dollars)		%
	1954	1953	Change
Total 24 Cities.	34,535,433	35,295,347	-2.2
New York City	42,435,193	37,671,604	+12.6
Total 25 Cities.	76,970,626	72,966,951	+5.5

NEW BUSINESS INCORPORATIONS				
Geographical Divisions:	May 1954	May 1953	Five Months	1953
New England...	575	576	3,083	2,985
Middle Atlantic...	2,941	2,896	15,789	15,065
East North Central	1,464	1,473	8,251	7,526
West North Central	444	453	2,431	2,268
South Atlantic...	1,297	1,301	6,866	6,675
East South Central	268	263	1,370	1,283
West South Central	715	591	3,045	2,873
Mountain.....	460	375	2,095	1,780
Pacific Coast....	1,116	1,040	5,212	5,090
United States....	9,280	8,968	48,142	45,545

DAILY WHOLESALE PRICE INDEX
The index is prepared on the basis of daily spot closing prices of 30 primary commodities (1930-1932=100).

Week Ending Mon. Tues. Wed. Thurs. Fri.
June 25... 271.76 271.71 272.24
June 18... 272.91 271.80 271.10 271.62 271.71
June 11... 274.89 274.50 274.18 273.99 273.74
June 4... 274.00 273.45 273.39 274.17

WHOLESALE FOOD PRICE INDEX
The index is the sum total of the prices per pound of 31 foods in general use. It is not a cost-of-living index.

Latest Weeks Year Ago 1954
June 22 \$7.28 June 23 \$6.57 High May 25 \$7.46
June 15 7.23 June 16 6.51 Low Jan. 5 6.85
June 8 7.36 June 9 6.54 1953
June 1 7.38 June 2 6.56 High Dec. 29 \$6.81
May 25 7.46 May 26 6.47 Low Feb. 3, 6.13

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problems of feed, control, transfer, synchronization, etc. which must be dealt with in a highly automatized plant such as this. Hydraulic power can be developed wherever most convenient and applied at any other location. Simplification of design, flexibility of control, instantaneous response, rapid operation, ease of providing interlocks and overload protection, low maintenance . . . all are characteristics of Vickers Hydraulic Systems.

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The Trend of BUSINESS

failures, for less than \$5,000, and among very large ones in excess of \$100,000, but casualties in the \$5,000 to \$25,000 size group were half again as heavy as a year ago.

Businesses under five years old predominated, comprising 63 per cent of the total May failures. The largest single portion of the casualties during the month, 18 per cent, represented concerns which had started operations in 1952.

Retailing accounted entirely for the lower mortality in May. The dip was generally slight, except for a marked drop in apparel store failures to the lowest level this year and a considerable decline among eating and drinking places.

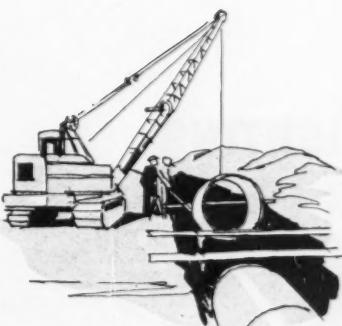
The manufacturing toll held steady during the month, while other functions showed moderately higher failures. The number of textile and apparel manufacturers failing fell to the lowest level in eight months, but the toll among leather-making concerns mounted to the highest level since the middle of 1950 and among machinery manufacturers to the most since the beginning of 1950. All industry and trade groups had more casualties than in May 1953, with construction suffering the sharpest rise.

Five geographic regions reported

FAILURES BY DIVISIONS OF INDUSTRY

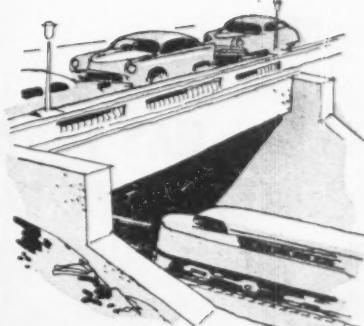
(Current liabilities in millions of dollars)	Number of Liabilities			
	5 Months 1954	5 Months 1953	5 Months 1954	5 Months 1953
Mining, Manufacturing,...	997	699	86.0	54.3
Mining—Coal, Oil, Misc...	27	17	5.7	0.9
Food and Kindred Products...	74	65	8.7	7.3
Textile Products, Apparel...	245	164	12.5	9.8
Lumber, Lumber Products...	141	103	7.5	5.6
Paper, Printing, Publishing...	61	49	6.2	4.3
Chemicals, Allied Products...	35	28	1.6	4.1
Leather, Leather Products...	41	42	2.4	3.8
Stone, Clay, Glass Products...	26	17	0.9	0.8
Iron, Steel, and Products...	52	24	6.8	3.9
Machinery...	121	61	22.4	7.3
Transportation Equipment...	23	17	3.1	1.7
Miscellaneous...	151	114	8.2	4.9
WHOLESALE TRADE...	462	367	22.0	20.0
Food and Farm Products...	122	101	5.5	5.2
Apparel...	19	13	0.4	0.4
Dry Goods...	30	13	1.2	0.6
Lumber, Bldg Mats, Hdware...	44	37	2.2	3.9
Chemicals and Drugs...	20	13	0.5	0.5
Motor Vehicles, Equipment...	20	16	0.6	0.4
Miscellaneous...	207	174	11.5	9.1
RETAIL TRADE...	2,445	1,731	70.2	5.7
Food and Liquor...	438	359	6.1	1.6
General Merchandise...	88	66	4.3	6.8
Apparel and Accessories...	393	259	8.0	10.0
Furniture, Furnishings...	435	267	26.5	2.3
Lumber, Bldg Mats, Hdware...	137	79	4.1	5.1
Automotive Group...	256	194	8.0	7.3
Eating, Drinking Places...	406	302	7.7	1.3
Drug Stores...	67	44	1.3	2.8
Miscellaneous...	225	161	4.4	43.0
CONSTRUCTION...	541	405	21.9	15.9
General Bldg Contractors...	183	148	10.3	7.1
Building Sub-contractors...	328	237	10.0	6.7
Other Contractors...	40	20	1.6	2.1
COMMERCIAL SERVICE...	368	265	15.6	8.7
TOTAL UNITED STATES...	4,813	3,467	215.7	142.0

Liabilities are rounded to the nearest million; they do not necessarily add to totals.



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7 Projects Actually Underway
Totaling \$13,050,000
6 Projects in Active Planning
Totaling \$13,250,000

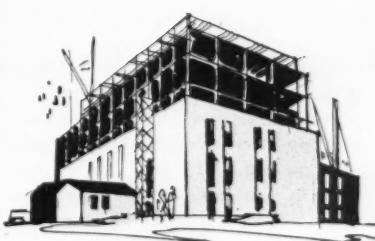


... local-state-Federal-governmental jointly sponsored improvement program:

3 Projects Actually Underway
Totaling \$16,300,000
4 Projects in Active Planning
Totaling \$65,500,000

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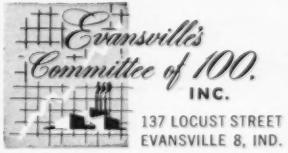
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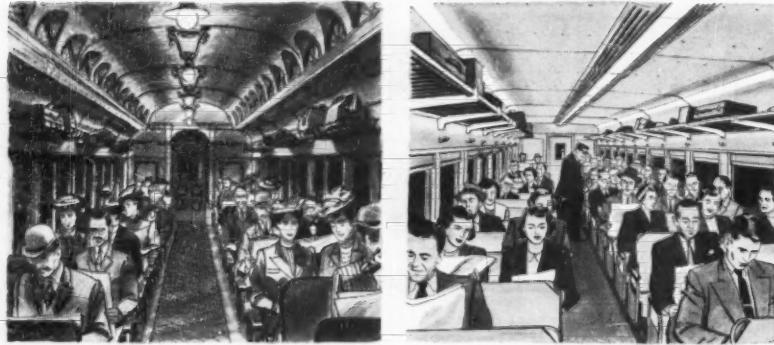


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The Trend of BUSINESS

a downturn in failures in May. The size of their declines was relatively small, however, except for the Middle Atlantic where the dip amounted to 11 per cent. Meanwhile, increases occurred in four areas. In fact, in three (the New England, East and West South Central States) mortality edged up to the highest level so far this year. An upward trend from 1953 prevailed in all regions. Twice as many businesses failed in the New England States, notably in Massachusetts and Rhode Island, and in the West South Central States, notably Texas. The Middle Atlantic rise from the previous May centered in New York State, the East North Central in Illinois, Michigan, and Indiana, the South Atlantic in West Virginia and Florida, the Mountain in Arizona, whereas all three of the Pacific States showed marked percentage increases from May 1953.

In both the 25 largest cities and the balance of the country, casualties changed only slightly in May, dipping 2 per cent in the cities and 4 per cent in the non-metropolitan districts. The latter areas, however, showed a considerably sharper up-swing in mortality from 1953 than did the cities.

THE FAILURE RECORD

	May 1954	April 1954	May 1953	P.C. Chg.†
DUN'S FAILURE INDEX*				
Unadjusted.....	43.1	42.9	31.5	+37
Adjusted, seasonally	41.0	39.7	30.0	+37
NUMBER OF FAILURES	943	975	697	+35
NUMBER BY SIZE OF DEBT				
Under \$5,000.....	149	148	129	+16
\$5,000-\$25,000.....	482	514	323	+49
\$25,000-\$100,000.....	243	242	184	+32
\$100,000 and over.....	69	71	61	+13
NUMBER BY INDUSTRY GROUPS				
Manufacturing.....	200	200	143	+40
Wholesale Trade.....	91	82	74	+23
Retail Trade.....	460	535	344	+34
Construction.....	111	92	70	+59
Commercial Service.....	81	66	66	+23
(LIABILITIES in thousands)				
Current.....	\$38,494	\$42,512	\$32,789	+17
Total.....	39,068	43,160	33,932	+18

*Apparent annual failures per 10,000 listed enterprises, formerly called DUN'S INSOLVENCY INDEX.
†Per cent change, May 1954 from May 1953.

BUSINESS FAILURES include those businesses that ceased operations following assignment or bankruptcy; ceased with loss to creditors after such actions as execution, foreclosure, or attachment; voluntarily withdrew leaving unpaid obligations; were involved in court actions such as receivership, reorganization, or arrangement; or voluntarily compromised with creditors out of court.

CURRENT LIABILITIES, as used in the Failure Record, have a special meaning; they include all accounts and notes payable and all obligations, whether in secured form or not, known to be held by banks, officers, affiliated companies, supplying companies, or the Government. They do not include long-term, publicly held obligations. Offsetting assets are not taken into account.

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CHIEF EXECUTIVE

(Continued from page 35)



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importance to the enterprise. Each would be time-consuming. And each would require careful planning, thought, and preparation. The job, if pared to the bone, would still exceed the "span of managerial responsibility" of any one man. An unlimited supply of universal geniuses could not save the one-man chief-executive concept, unless they could also bid the sun stand still in the heavens. And even Joshua could accomplish this only once, whereas the one-man chief executive would have to perform the miracle seven days a week to get his job done.

But the activities that together make up the chief-executive job are also too diverse to be performed by one man. The list I gave includes things that have primarily to do with planning, analyzing, and policy formulation like the determination of the company's business, the setting of objectives, and so forth. They include things that require fast decisive action, for instance the handling of a major crisis. Some of these things deal with the long-range future. Others with immediate problems. Yet it is a rule that to-morrow's business will not get done if you mix it with to-day's business, let alone with yesterday's. Some activities require the skill of the negotiator, as in the arbitration of internal clashes or the floating of a capital issue. Others require the skill of the educator. Others still are "relations" skills.

The very least that would seem to be required are three distinctive characters: the "thought man," the "man of action," and the "front man," one of my friends in a top management calls them. Two of these characters may be found combined in one man ("But do you really want a schizophrenic in the chief-executive's job?" the same friend asks). All three are most unlikely to be found together in one man. Yet in all three major areas there are important activities that have to be discharged well if the enterprise is to prosper. And these activities are part and panel of the chief-executive job.

"There is only one conclusion: the chief-executive job in every business (except perhaps the very smallest) must be the job of a team of



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Another uses his time to cut costs and increase his company's efficiency.

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several men who together are the chief executive. There are two important additional arguments for this conclusion. The first is the isolation of the chief executive.

The president of a company, whether large or small, is of necessity isolated. Everybody wants something from him. His managers want to "sell" him their ideas or want to advance their position. The supplier wants to sell him goods. The customer wants better service or lower prices. The president is forced to adopt an "arms-length" attitude in his dealings with people in sheer self-defense. Also, as soon as the business attains even small size, most everything brought to him for information or decision is of necessity predigested, formalized, and abstract. It is of distillation rather than the raw stuff of life. Otherwise the president could not deal with it at all.

His social life, if he has any, is usually spent with other people of similar rank and station, so that he rarely as much as meets people whose point of view, experience, and opinions are not similar to his. He may be the most easy-going fellow in the world, but his plant visits or his executive luncheons will have, without any fault of his, all the "informality" of a Byzantine state visit. As a result, as one of the shrewdest observers of management once said to me: "There is no lonelier guy any place than the fellow in the president's chair."

Organizing the chief-executive's job properly will accentuate this isolation. Everybody agrees that the chief executive should spend more time on thinking and planning. But this means that he should spend less time, or no time at all, talking to customers over the telephone, handling production or design details, seeing chance callers or charity canvassers, chatting with a newspaperman, or "being one of the boys" at a sales convention. Yet these are all things that, however inadequately, break the chief executive's isolation.

Yet, proper organization of the job is imperative. To achieve it, and with it a high degree of chief-executive isolation, while maintaining the effectiveness of the human beings in the job, a chief-executive team is needed.

This alone can provide the top executive with people to talk to

who are on his level and who do not therefore want anything from him; people with whom he does not have to watch every one of his steps or words; people with whom he can "think aloud" without committing himself. This alone would also enable us to bring into the chief-executive job the variety of viewpoints, opinions, and experiences needed for sound decisions.

Similarly, the chief-executive team alone can adequately solve the problem of the succession to the chief-executive job. If there is only one man in the job his succession cannot really be planned; it will be fought over (as it is in Cameron Hawley's best seller, *Executive Suite*). The retirement of the top man—and even more his death or disability—will produce a real crisis. And once appointed, the one-man chief executive can be neither removed as a rule, nor effectively neutralized, no matter how poor a choice he turns out to be. If the chief executive is a team however, say three men, there will normally never be a total turnover. To replace one man out of three is fairly easy. It produces no "crisis." And a mistake is neither fatal nor normally irrevocable.

The demands of to-morrow on top management will make the one-man chief executive totally unable to function. The length of the future into which basic decisions have to be projected is increasing so fast as to make absolutely necessary careful and deliberate study and planning. Decisions based on "intention" or "hunch" and made "off the top of the head" simply will not work; such decisions are always based on past experience, rather than on analysis of the probable future. Careful and deliberate decision-making, however, requires time; it cannot be sandwiched in between two "rush" telephone calls. It also requires understanding of the complex process of decision-making and skill in the application of its strict rules.

Finally, the chief-executive job of to-morrow will include understanding of a host of new basic tools of mathematical and logical analysis, and of measuring. It will require ability to see where these tools can be applied, ability to educate other members of management in their meaning and use, and some elementary skill in applying them.



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Thus, 20 years hence, or even much sooner, the chief-executive job will require not only a "front man," a "thought man," and a "man of action," but, in addition, a first-rate analyst. Certainly no one man can play these four parts well, in one life, let alone succeed in cramming all into a working day.

That the chief-executive job should be a team job will be considered rank heresy—even by many who in their own companies have organized it on the team basis. Most organization theorists seem to think that the one-man chief executive is a law of nature, if not an axiom, requiring no proof and admitting of no doubt.

That there is no such law of nature is abundantly proven, however, by the fact that the most successful organization of management outside the United States always organized the chief-executive job as a team job. The large company in Germany has always had a team management. One member customarily presides over the team but all are equal. Similarly, those marvels of efficient management organization, the "Big Five" of British banking, have always been managed not by one, but by two chief-executive teams: the Chairman and the Deputy Chairman, concerned with basic objectives; and the Joint General Managers, concerned with policies, practices, and personnel.

Obviously, the organization theorist's axiom is nothing but American folklore. It is based partly on wrong analogies between business enterprise and military organization. Partly it arose from a failure to understand that the American President (after whom the theorist's image of the "company chief executive officer" is clearly patterned) is only one of three coordinate branches of government, all three of which together are the organ of sovereignty.

That there is, appropriately, great doubt regarding the one-man chief executive is indicated by the severe crisis in which the concept finds itself to-day. Wherever we have actually tried to apply it, especially in

the larger company, we have run into serious trouble. One indication of this is that the one-man chief executive officer is no longer capable of making the decisions that he is supposed to be making.

He approves the most fundamental decisions affecting the survival of the company on the basis of a one-page recommendation; that is, on a basis that does not allow him to judge the decision at all, let alone to change it. All he can really do is accept it or turn it down. Worse still, he makes his decisions increasingly on the basis of highly stylized "presentations," which aim at getting a "yes" from the "boss" with a minimum of discussion; and that means with a minimum of understanding on the part of the "boss."

Even worse, is the growth of "kitchen cabinets" in those companies that try to live up to the theorist's demand for a one-man chief executive. Being unable to do his job, the chief executive officer surrounds himself with a motley staff of personal confidantes, miscellaneous assistants, "analysts," a "control section," and so forth. None of these have any clearly defined duties. None has any definable responsibility. But all have direct access to the "boss" and are credited throughout the organization with mysterious powers. They undercut the authority of operating managers, duplicate their work, and cut them off from easy communication with the chief executive. They are the worst causes of malorganization imaginable. Yet the one-man chief executive needs the "kitchen cabinet." Not being allowed to organize a proper chief-executive team he has to make do with errand boys, private secretaries, chief clerks, and favorites to whom basic decisions increasingly fall.

Another sign of the disintegration of the one-man chief-executive concept is the tendency towards a form of executive dropsy in the large company. More and more levels of top management intervene between the actual business and the "chief executive."

The final proof that the one-man chief-executive concept is a theoretical phantom is the speed with which it is being abandoned in practice by company after company. There is usually still someone called a "chief executive officer" in these

companies. But actually the chief-executive job is discharged by a group working as a team.

Actually, there is serious doubt whether the successful business ever used the one-man chief-executive concept. Practically every case of business growth is not the achievement of a one-man chief executive but the work of at least two, and often of three, men working together as a chief-executive team. At its inception a company is often the "lengthened shadow of one man." But it will not grow and survive unless the one-man top is converted into a team.

General Motors, in the period of its great growth, was managed by a chief-executive team consisting always of two, and usually of three, men: Alfred P. Sloan, Jr. (president and later chairman of the board) working as a team with Donaldson Brown (vice-president, later vice-chairman of the board) usually with a third man, the company's actual president. At Sears, Roebuck, under the aegis of Julius Rosenwald, the "chief executive" consisted of three men: Mr. Rosenwald himself, his legal advisor, Mr.

Loeb, and Mr. Doering in charge of mail-order operations. The same is true of the two big oil companies. Both Standard Oil of New Jersey and its traditional closest competitor, Socony-Vacuum, were built in the 1920's by two-man teams.

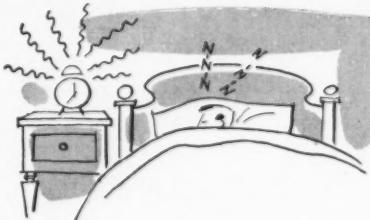
The list could be extended indefinitely. It would include American Telephone & Telegraph, General Foods, the Du Pont Company—most of America's large companies except Ford under Henry Ford I.

The same is true of successful small companies. Invariably they are run by two-man or three-man teams (typically, the company's president and sales manager, and the treasurer) who together discharge the functions of "chief executive officer." Again, the one-man chief does not go beyond the business babyhood.

And exactly the same is true of the federally decentralized unit within a company, such as a General Motors division or a General Electric product business. In such a unit, the team may consist of the general manager and one of his senior men, often the comptroller. Or it may consist of the unit's gen-

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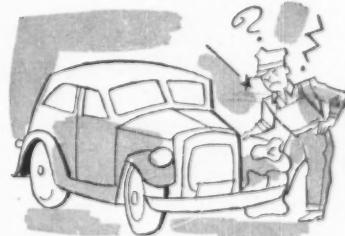
What happened to Joe before eight o'clock this morning?



Wouldn't you know it? The day of the big meeting and he didn't hear the alarm. The neighborhood traffic kept him awake half the night. Then, on his way to work, a "cut-in" driver nicked his fender. Another delay.

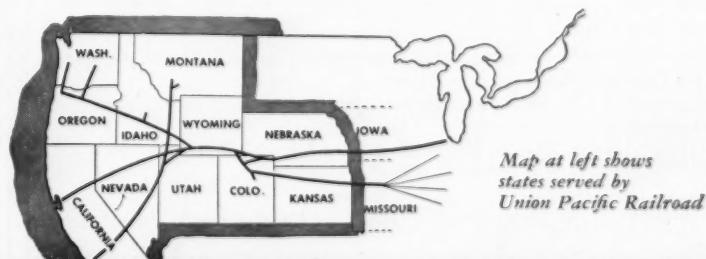
The fact is that even little things are beginning to get on Joe's nerves. Bucking traffic...the city's mid-summer heat...irritate him. So Joe's work is slipping. And he isn't a very pleasant fellow to be around. This doesn't build up to the "one big, happy family" idea his employer likes to talk about.

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eral manager and the manager to whom he reports: the "group vice-president" at General Motors, the "division general manager" at General Electric.

There is, in fact, only one argument for the one-man chief executive. And it is not very serious. There must be, the argument runs, one man responsible to the board of directors; and he must be the final "boss." But work with the board, though tremendously important, is only one of the functions of the chief executive. Also, most large-company boards to-day have several of the company's officers among their members. And the fact that the board works with a team of executives seems to cause no trouble.

In fine, the concept of the one-man chief-executive officer is contrary to all experience and to the demands of the job. In successful companies it is not being applied. And where it is being applied it leads into trouble and difficulties.

How, in these circumstances, should the chief-executive team be organized? The first requirement is that it be a "team" rather than a "committee." There should be no collective responsibility. Each member should have clearly assigned to him the areas in which he is responsible. Deliberation should be joint; decision, single.

The second requirement in organizing the executive team is that there be no appeal from one member to another. Whatever any one of them decides is the decision of all of top management.

This does not mean that there is no one on the team who acts as its captain. On the contrary, a captain is needed. And one man is almost certain to stand out as the senior member by virtue of his intellectual or moral authority. There was, for instance, never any doubt in General Motors that the head of the table was wherever Mr. Sloan sat; nor at Sears, Roebuck that General Wood was a good deal more than the "first among equals." But whenever one man thus stands out, he has to be doubly careful not to countermand or overrule the others, not to interfere in the areas assigned to them, not to let his superiority turn into their inferiority.

Next comes the requirement that all parts of the chief-executive job be clearly assigned to some one on the team—which of course presup-

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poses that the job has been studied and thought through.

In particular, there has to be clearly assigned responsibility for the determination of objectives in the key areas of business performance, and for the careful consideration of the impact of all business actions and decisions on performance and results in these areas. This responsibility can be part of the job of every member of the team; every member of the "Executive Committee" at Johnson & Johnson carries it, together with other responsibilities. It can be assigned to a "planning committee" of vice-presidents. It can be assigned to one man; in General Motors Mr. Donaldson Brown carried it, in effect, when he was vice chairman. Or each key area can be assigned to a separate man as a full-time job. That, however, is for the giant business only; it is the approach of General Electric, where the "executive office" (in addition to president and "group executives") contains a large number of "services vice-presidents."

What matters, above all, is that the responsibility for long-range

planning and thinking, for clear objectives and for the development of adequate yardsticks to measure their attainment, and for the education of managers in the vision and the skills needed to reach the objectives, all be clearly spelled out and unambiguously assigned.

But how many members should the team have? The answer is: the fewer the better, but more than two.

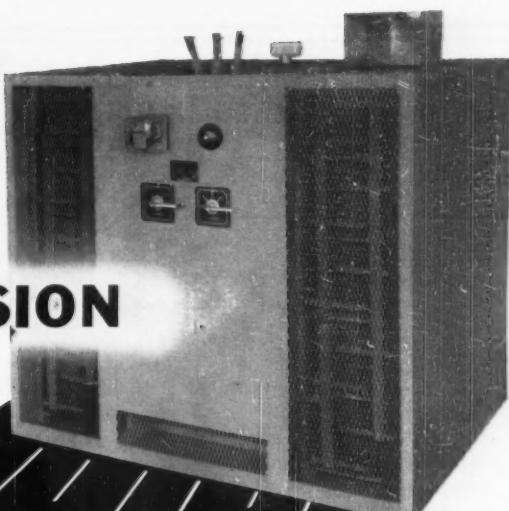
If two men can work together closely they form indeed an ideal team. But, in the first place, two people like this are rarely found. And two people in a team are always a highly unstable combination. "If there are only two men," a veteran member of a chief-executive team once told me, "even a slight disagreement may become dangerous. If there is a third member, the team can function even if the two others barely speak to each other." A two-man team can therefore function only if the two men are held together by strong emotional bonds, which is in itself undesirable.

Finally, a two-man chief-executive team aggravates the problem of succession. Precisely because the

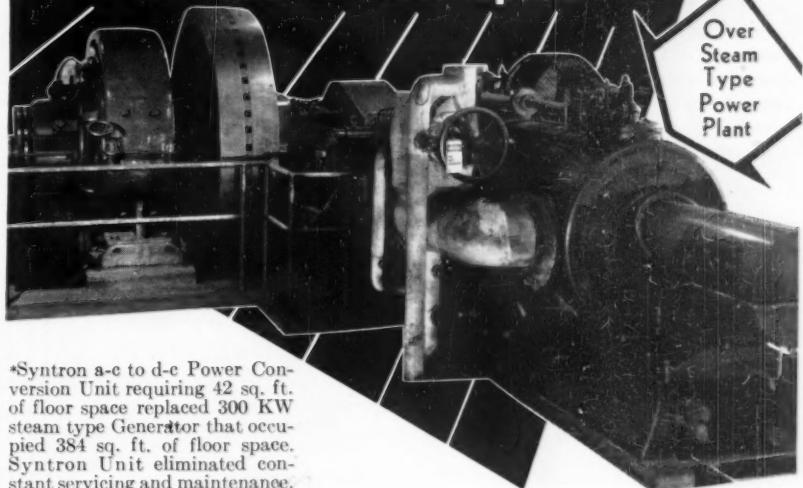
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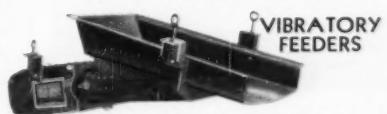
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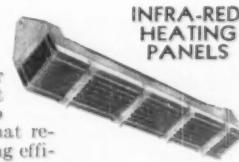
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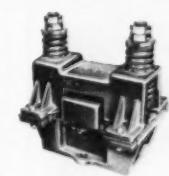
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two members have to be close to each other, they usually retire together; the survivor would find it almost impossible to adjust to a new partner. Yet one of the important benefits of the chief-executive team lies in its providing continuity of top management and in its making succession easy instead of critical or stormy.

How many men the team actually has will depend on the size and complexity of the business. As a rule three should be the lowest number.

Duties of Board

But there are real functions that only a board of directors can discharge—so much so that we would have to invent such an organ if we did not have it. Somebody has to approve the decision as to what the company's business is and what it should be. Somebody has to give final approval to the objectives the company has set for itself and the measurements it has developed to judge its progress towards these objectives. Somebody has to look critically at the profitability objective of the company, its capital investment policy, and its managed-expenditures budgets. Somebody has to discharge the final judicial function in respect to organization problems, has to be the "supreme court." Somebody has to watch the spirit of an organization, has to make sure that it succeeds in utilizing the strengths of people and in neutralizing their weaknesses, and that it develops to-morrow's managers. Somebody has to make sure that the rewards to managers, the management tools, and management methods strengthen rather than weaken the organization, and direct it towards its objectives rather than misdirect it away from them.

This "somebody" must be an organ of review and appraisal that is independent of and different from the chief executive.

A management that tries to run its enterprise without a genuine board is trying to load yet one more function onto the many functions it already has to discharge.

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gan of appraisal of performance and results. It is an organ of appeal for management people on matters affecting their status and authority. Only in a crisis will it become an organ of action; and then only to remove existing executives who have failed, or to replace executives who have resigned, retired, or died.

It is also necessary that those members of the chief-executive team who are charged with responsibility for the determination of company objectives work directly with the board.

The board must also be detached from operations. It must view the company as a whole. This means that working executives of the company should not dominate the board. In fact, the board will be stronger and more effective if it is genuinely an "outside" board.

However, to obtain real benefit from the board its membership must be carefully selected. Both the large and the small business need board members whose experience, outlook, and interests are different from the experience, outlook, and interests of the company's management. This cannot be obtained by getting representatives of the company's bankers, the company's suppliers, or the company's customers on the board. What is needed are people who are likely to see things differently than management sees them, who are likely to disagree and to question—especially to question the assumptions on which the chief-executive team acts without, usually, even knowing that it is making them.

And, to get the kind of people the company needs, board membership will have to be financially attractive.

That the board can be made into the vital, effective, and constructive constitutional organ it should be has been demonstrated by several companies that have systematically worked on the problem. Merck & Company, for instance, considers this work of building a strong and effective board to have been a major factor in its rise to leadership in its industry.

While difficult, building a strong and effective board is one of the most important things the chief-executive team can do—and one of the major conditions for its own success in discharging its own job.

THE END

73,000 impressions for \$2.80...

and still going strong

For more than ten years, the familiar little trademarked figure of Reddy Kilowatt has been doing a selling job for electric companies on the surface of this business gift Zippo.

You can see from the honorable marks of use how the owner keeps his Zippo constantly with him! Each time it flashes into flame, the donor's business message flashes into view—an estimated 73,000 times to date!

That's mileage for a message—frequency of impression, and impact you seldom get in any other way! What better way to have your trademark seen and discussed?

Men become so attached to faithful, easy-lighting Zippos that they carry them everywhere! Your message will be seen by scores of people daily—at business meetings and on outings and social occasions, for many years. The man you give a Zippo to will never give it up! Yet the investment is very modest. Send coupon now!



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ANYWHERE...ALWAYS

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In Canada: Zippo Manufacturing Co., Canada Ltd.,
Niagara Falls, Ont.

ZIPPO MANUFACTURING CO., Dept. D-34, Bradford, Pa.

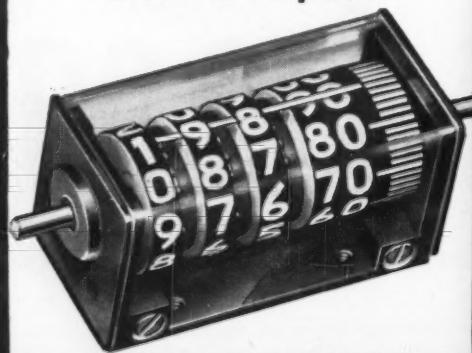
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Fast, Smooth
Operator
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different jobs**



*Added Evidence
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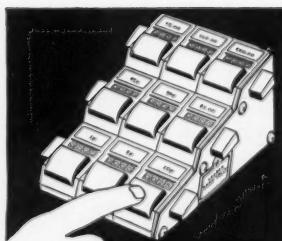
This new, high-speed direct-drive counter . . . with its one-piece "show window" case . . . was first developed for use in navigational and directional instruments. Then, because of its many adaptable features, it is eligible for employment in many other jobs. It's good for speeds up to 1800 rpm . . . temperatures from 67° to 185° F . . . and it's corrosion resistant. Drive shafts can be longer on either side or both. And base may be lengthened to take more figure-wheels if you want. All in all, a remarkably versatile performer . . . one of scores of standard and special Veeder-Root Counters for every mechanical and electrical application from Electronics to Automation. Write:

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"The Name that Counts"



New Vary-Tally Multiple-Unit Reset Counter comes in any combination up to 6 banks high, and 12 units wide. Write for news sheet and prices.

NEW METHODS AND MATERIALS

*Fibers, fasteners, fluorine plastics
give new fillip to plant and product.*

Firmer grip for your product

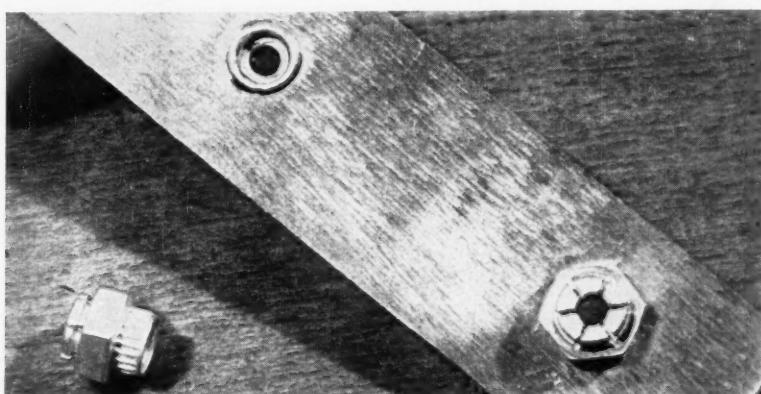
Fasteners that are bigger, stronger, tougher, more corrosion-resistant. . . . Fasteners that are smaller, cheaper, easier to handle. . . . Fasteners of nylon, polyethylene, titanium, stainless steel. . . . These are only a few of many recent innovations.

For example, Shakeproof Division, Illinois Tool Works, now injection molds rivets, nuts, and grommets of such plastics as nylon, cellulose acetate, polyethylene, and polystyrene. In addition to performing their fastening jobs, many of these serve a dual—and even a

triple purpose. Shakeproof "Plasti-rivets," for instance, with a slight design modification, become refrigerator shelf supports. Others serve as spacers, plugs, electrical insulators, and decorative elements.

Another type of dual service is provided by such fasteners as Standard Pressed Steel's "Flexloc" clinch locknuts, pictured below.

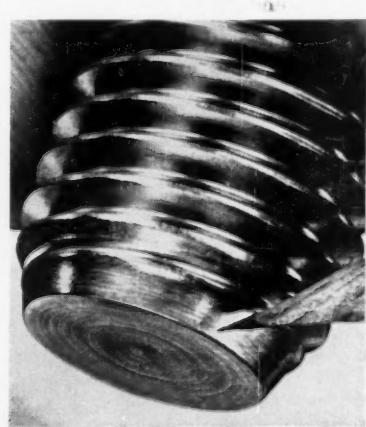
For applications where light weight and materials savings are important, companies like Federal Tool & Manufacturing, Penn Engineering & Manufacturing, Palnut, Shakeproof, Tinnerman, Waldes-Kohinoor, and Waterbury Pressed Metal have a host of stamped speed nuts, clips, and retaining rings that



New combinations solve tough fastening problems. These Flexloc clinch locknuts can be mounted blind, and used on thin-section base materials.



New points make socket screws easier to insert. Allen Manufacturing now makes set screws (left) with smaller points; gives cap screws new leader.



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Please send free sample portfolio and complete information on the Hunter Heccokwik Photo-Copying Machine.

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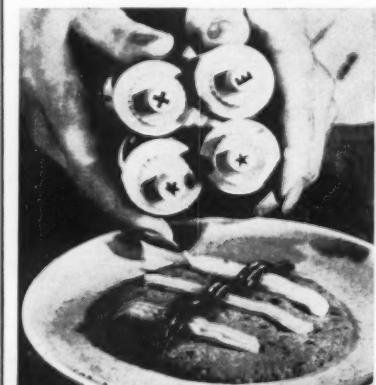
snap on quickly and hold securely. And Elastic Stop Nut Corporation of America has four new lines of lightweight nuts designed specifically for aircraft use. Some duplicate in aluminum items previously made of steel; others achieve weight savings through redesign.

Where frequent opening and closing pose problems, there are special designs of many types. One, for instance, is a new Southco adjustable pawl fastener that permits opening and closing with a quarter turn.

Standard set screws and socket screws are being improved in many ways by such companies as Allen Manufacturing (see photograph); Mac-it Screw Division of Strong, Carlisle & Hammond; and Set Screw & Manufacturing Company. And to permit use of screws like these in plastics and other hard-to-hold materials, Heli-Coil Corporation has a slew of lightweight, easy to embed threaded inserts that can take the place of bushings.

It's hard to overrate the importance of fasteners in both design and production. Last year, for instance, fasteners alone consumed as much steel as all agricultural uses; and more than did barrels, drums, and shipping pails. W. C. Stewart, Technical Advisor to the Industrial Fasteners Institute, estimates that about 100 billion fasteners are produced each year.

For those who are interested in the over-all picture of fastener development, production, and usage, a new Bethlehem Steel movie, *Holding Power*, is well worth seeing.



More jobs for polyethylene

Polyethylene, the attractive, workable plastic that offers so many useful product qualities (see June, page 44) continues to find new and interesting jobs. Cake icing tube caps, at left, take advantage of plastic's flexibility and non-toxicity. New thin-walled bottle (right)

is designed for single-use, disposable packaging of drugs and other liquids. Bakelite supplies polyethylene resin for the tube caps, which are molded by Elmer E. Mills. The bottle is made by Plax Corporation. (For other news of polyethylene, see page 68.)

**How new fibers
aid plant operations**

If you need a better measuring tape, stronger conveyor belting, more durable filters, take a look at the products now being made of Teflon, Dacron, nylon, dynel, polyethylene, and glass fibers.

For example, Lufkin Rule Company now offers woven nylon-Dacron measuring tapes, nylon-coated for abrasion resistance. They are light in weight, moisture-resistant, dimensionally stable, and, of course, non-rusting. They're particularly useful, Lufkin points out, for electrical work, since they are non-metallic.

Filter cloths can now be had in almost all the synthetic fibers—and each has special advantages for plant operations. For instance, National Filter Media Corporation, which recently introduced Teflon (tetrafluoroethylene) filter cloths, notes that these cloths resist almost everything but fluorine gas and molten metals, won't stick to other materials, and have near-zero moisture absorption.

Dacron, and its British sister, Terylene, are also being used in filter cloths—and a host of other applications because of their high strength, flex and abrasion resistance, and ability to withstand alcohols, bleaching agents, and halogenated hydrocarbons. Recently, for



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TIME—Fast, automatic, trip-hammer action. Drives staples fast as you grip. Take-up Jaw makes on-the-job servicing quicker, easier.

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Available in most colors each with double-size Kimball Ink Cartridge for long usage. Refills may be purchased anywhere.

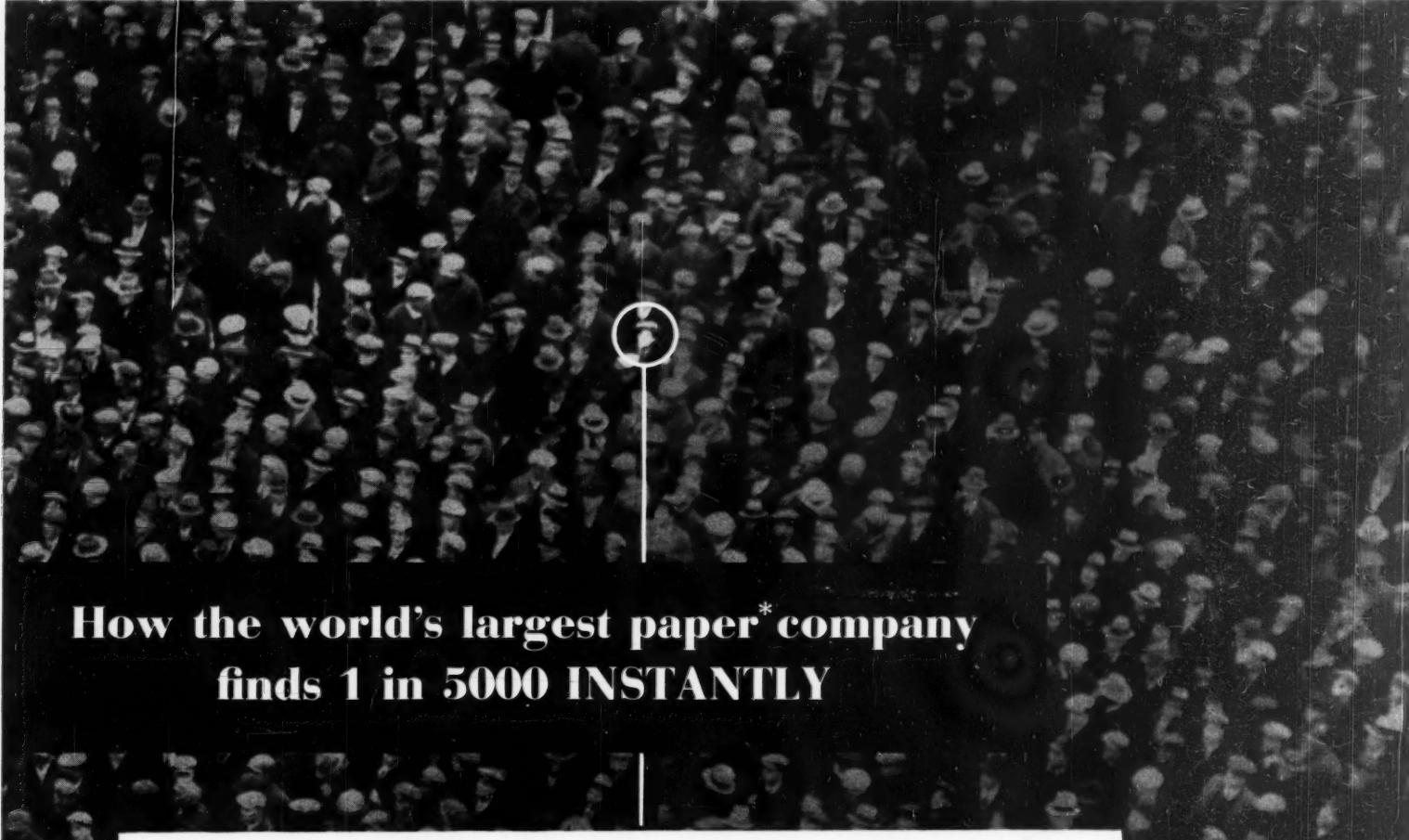
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How the world's largest paper* company finds 1 in 5000 INSTANTLY

The world's largest kraft* paper plant, Union Bag & Paper Corp. of Savannah, needs 5000 employees to process 200 car-loads of southern pine *every day* . . . into 1800 tons of kraft paper, 35 million paper bags and 300 tons of corrugated boxes!

Personnel records posed a gigantic problem. All data on every employee needed to be *instantly* available — reference time cut to seconds. Ordinary file folders were out of the question.

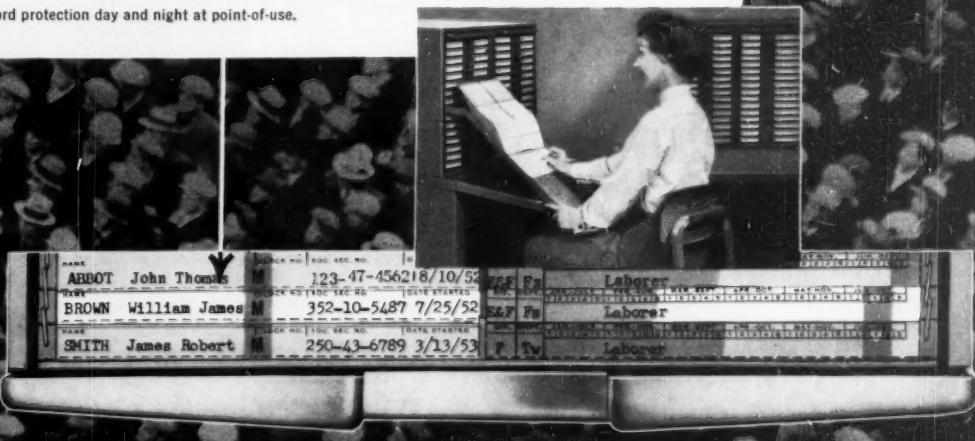
The solution: Safe-Kardex[†] cabinets in which are indexed specially designed forms that contain condensed, complete, personal

data on every employee. This also provides for a complete service record, with all pertinent information visibly signalled . . . reference virtually *instantaneous*. The entire simplified system planned and installed by our Business Services Departments.

Get free copy "How Remington Rand Systems Simplified Personnel Records At The Union Bag & Paper Corp. of Savannah, Georgia"—CR906. Write Remington Rand, Room 1704, 315 Fourth Ave., New York 10.

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It will pay you well to find out how P-A-X can save man-hours and money for your organization. Complete facts and on-the-job case studies of P-A-X performance are yours on request. Call or write Automatic Electric Sales Corporation, (HAYmarket 1-4300), 1033 West Van Buren Street, Chicago 7, Illinois.



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instance, Hamilton Rubber Manufacturing Corporation introduced "Dacro-Flex" fire hose, in which, Hamilton reports, the Dacron reinforcement permits a lighter, more flexible construction while meeting standard pressure specifications.

At this year's British Industries Fair, Imperial Chemical Industries exhibited Terylene braided cord for end windings on electrical equipment, tow ropes, netting twines, fire hose, transmission and conveyor belting, protective clothing, boots, luggage, and awnings.

Glass fibers are appearing in new forms as well as in new fields. For instance, glass-fiber-based papers, developed in the past few years, open a number of interesting possibilities. As Owens-Corning Fiberglas Corporation points out, these papers are chemically inert, non-flammable, have high wet strength, are heat-resistant, dry rapidly, and resist rot and mildew.

In addition to filtration applications, O-C suggests glass paper for a variety of electrical and electrolytic jobs (battery separators, dialysis membranes, condenser and transformer core papers), and notes that it might also prove useful for printing legal records and other valuable documents.

In short, wherever heat, chemicals, moisture, or other adverse con-

ditions pose severe operating problems, the new fibers are well worth a close look.

In brief

Ammonia leaks can be detected before they become serious by burning sulfur-impregnated tapers (a white cloud of smoke indicates presence of the gas), notes the Nitrogen Division, Allied Chemical & Dye Corporation, 40 Rector Street, New York 6, N. Y. It offers a convenient pocket-sized kit of "Sulfavist," free on letterhead request.

Edible greeting cards are not only a bright sales idea, but also a fine example of how old and new materials can combine to bring new products. Developed by Candy Crafts, 1841 Rosewood Avenue, Richmond, Va., the "Eat-a-picture" greeting cards presented plenty of problems—not only in finding a base material with a good shelf life and good printability, but also a protective covering that would keep the card dry and safe. A. A. Wengler, the inventor, reports it took seven years—but the result is going better than hot cakes. A thin marshmallow sheeting is used as the base; vegetable dyes print design and message; and polyethylene bags provide the needed protection.

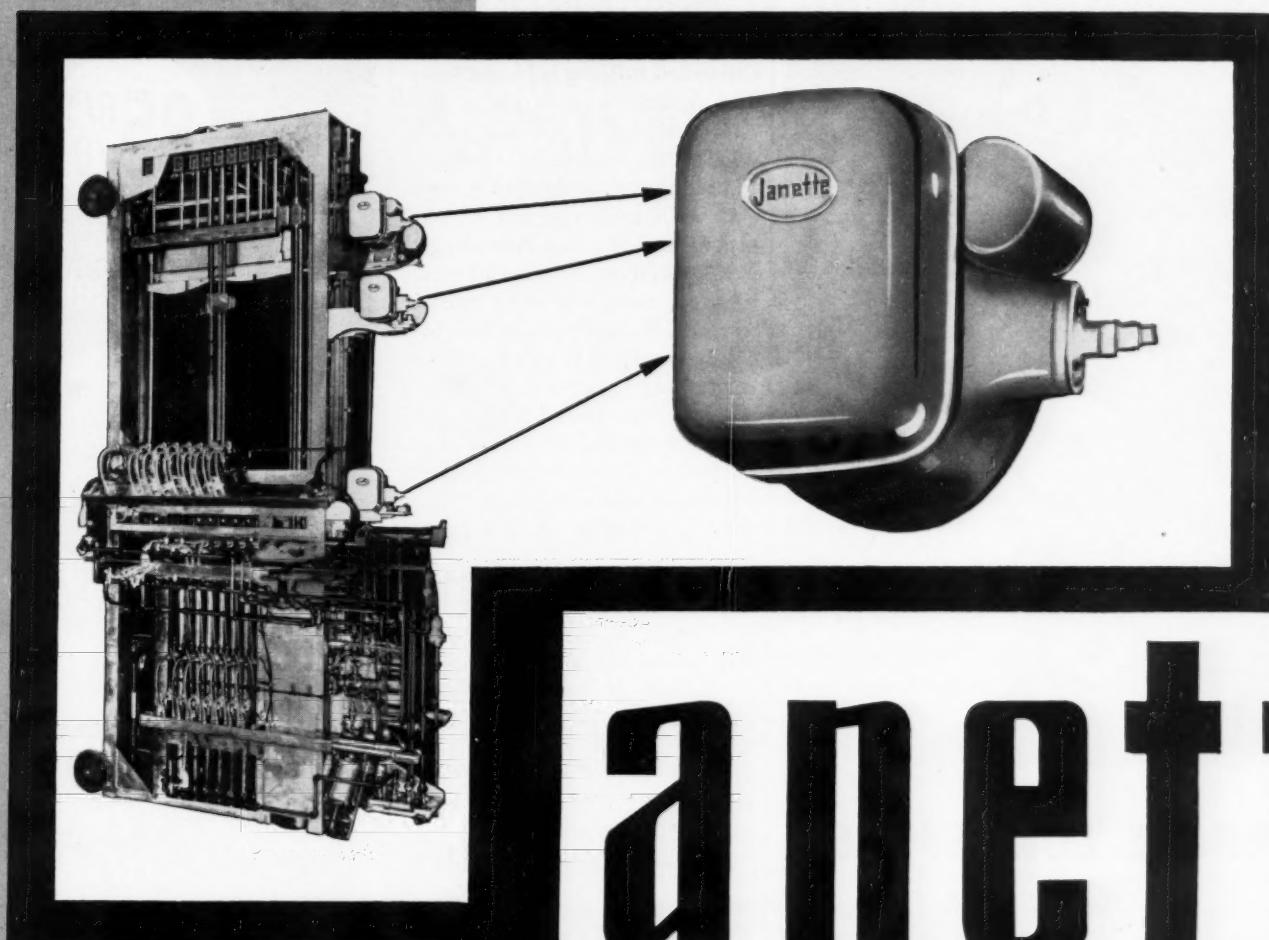


New kit speeds carbon choice

Interested in air or solvent recovery, air freshening, purification of gases or liquids, chemical catalysis? Activated carbon can help in all these jobs, says Barneby-Cheney Company, Columbus, Ohio, which offers the new kit pictured above to help prospective users in these

and a number of other fields select the right type. The kit contains six samples, ranging from one-fourth-inch granules to finely divided powder, each in a plastic vial. (For another new sample kit, see page 70; for story on sample use, see April, page 45.)

In developing first Atomic Submarine
top Management decides for...



janette

gear motors

to assure

"the right speed, the right power"

The nationally distinguished J. S. Barnes Corporation of Rockford, Illinois, designed and built the machine illustrated on this page. While the details of this remarkable equipment are top secret, it is permissible to say that among its many functions it is used to clean and test radioactive heating rods used in connection with the *Nautilus*, world's first atomic powered submarine.

To be certain of "the right speed, the right power" for this highly critical job, Barnes engineers, like ever-increasing numbers of top administrative, design and production executives since 1910, specified the Janette gear motors you see on the unit.

For highly specialized assistance with any problem involving speed and power, depend on Janette. Consult your Classified telephone directory for the name of your nearest Janette Representative—or write direct for Janette's new price list and merchandising plan.

**Gear
Motors**



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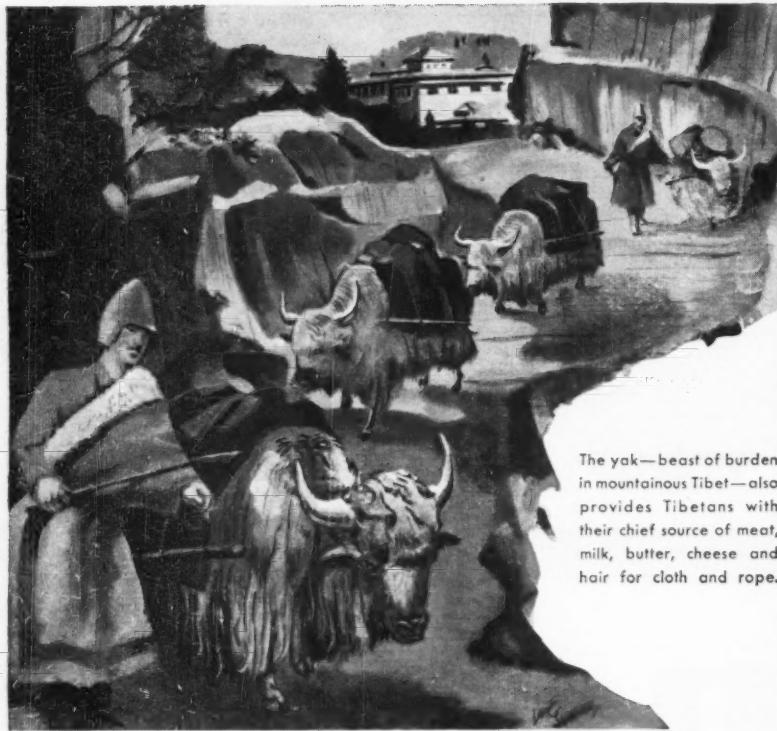


Janette Electric Mfg. Co.

Subsidiary, Gerity-Michigan Corp.

Morton Grove,

Illinois



The yak—beast of burden in mountainous Tibet—also provides Tibetans with their chief source of meat, milk, butter, cheese and hair for cloth and rope.

MULTI-PURPOSE CONVEYORS

Modern industrial conveyors are frequently designed to accomplish more than one useful production operation.

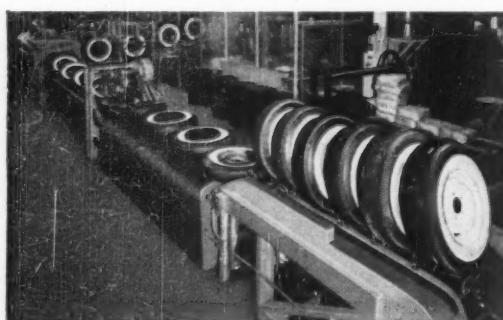
That's why some of Allied's most interesting and unusual installations have been those that best illustrate *Allied* ability and versatility for creating multi-purpose material handling equipment.

Allied have been Automation spe-

cialists for years—their installations include various types of conveyors, multiple transferring equipment, and highly engineered, fully automatic material handling systems.

If you are faced with a peculiar kind of material handling problem, you can confidently expect *Allied* to come up with a dependable and efficient solution.

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ALLIED AUTOMATIONS DIVISION

ALLIED STEEL and CONVEYORS, INC.
17367 Healy Avenue, Detroit 12, Michigan

One example of highly specialized Multi-purpose Equipment is this combination Tire Inflator, mounter and conveyor, designed and built by *Allied* for an automobile manufacturer.

against dirt and moisture. Candy Crafts is producing a standard line that retails for 10 and 15 cents.

Chemical milling is North American Aviation's name for a new, controlled etching process it has developed for producing waffle-like embossing and sculptured designs, and for over-all thinning of complex formed sections. According to NAA, metal can be removed evenly to meet close tolerances without warpage. Turco Products, Inc., 6135 South Central Avenue, Los Angeles 1, Cal., is licensed to produce the required chemicals and make the process available for general use. At present, the process is confined to aluminum alloys, but work is being done to extend it to other metals.

Designers and engineers who want to see how new fluorine plastics might fit their products can now obtain sample kits containing a selection of extruded, molded, and machined forms—from Dixon Corporation, Bristol, R. I. The Dixon kits, priced at \$10, contain samples of Du Pont "Teflon" and Dixon "Rulon" (a modified form for use as a bearing material).



For smoother finishing

A new kind of "sandpaper"—wire mesh coated with silicon carbide abrasive grains on both sides—has been developed by Carborundum Company, Niagara Falls, N. Y. According to Carborundum, "Sand Screen" lasts seven to fifteen times as long as conventional coated abrasives; and is particularly good for soft materials because its open-mesh construction reduces loading to a minimum. It's supplied in full and cut sheets, discs (as shown), and 50-yard rolls up to eighteen inches wide, for use on metals, wood, plastics, and painted surfaces.

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Messenger Service adopts Recordak Microfilming

Saves \$4,800 per year
—16 times the cost



MAKING OUT monthly bills at Hollywood's City Messenger Service took 80 hours per week. Recordak Microfilming slashed it to 4 hours, saving \$4,800 per year by eliminating costly manual transcription.

Bills are no longer itemized. Instead the individual order slips are microfilmed for the office record at a fraction of a cent each. Then they're sent out with the bill, which is merely the total amount due.

This short cut—besides slashing costs—improves customer relations. Questions are answered in advance . . . every pick-up and delivery is substantiated. *Other advantages:* Reference in a Recordak Film Reader is faster. There's a 98% saving in filing space. Protection is increased.

Total costs for Recordak microfilming equipment, film, and processing add up to only \$284 per year. *The savings, in bookkeeping, alone, are more than 16 times this investment!*

Can Recordak Microfilming cut your costs? In all probability, yes! For this truly amazing process is now simplifying record-keeping routines for over 100 different types of business . . . thousands of concerns. It will certainly pay you to check with a Recordak Systems Man soon. *No obligation whatsoever.*

Write Recordak Corporation (Subsidiary of Eastman Kodak Company), 444 Madison Ave., New York 22, N. Y.



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RECORDAK

(Subsidiary of Eastman Kodak Company)

**originator of modern microfilming—
and its application to business systems**





Delaware Water Gap Bridge viewed from the air from the Pennsylvania side. Owner: Delaware River Joint Toll Bridge Commission. Prime Contractor: Johnson, Drake and Piper, Inc., New York. Consulting Engineer: J. E. Greiner Co., Baltimore. Steel Fabricator and Erector: Bethlehem Steel Company.

BRIDGE WITH A VIEW



This progress photograph shows the twin spans, constructed on T-type granite-faced piers. Upstream pier faces are wedge-shaped to divert ice and debris.

This is the Delaware Water Gap Bridge, crossing the upper Delaware River between Pennsylvania and New Jersey. Officially opened for traffic in December, 1953, shortly after the above picture was taken, the bridge gives motorists a magnificent view of the famous Delaware Water Gap.

But even more pleasing to travelers is the fact that the new span, with its access highways, eliminates a serious bottleneck and speeds traffic to and from the Pocono Mountain resort area.

Constructed at a total cost of \$8,276,000, the four-lane toll bridge crosses the Delaware at a northwest-southeast angle, 28 degrees to the axis of the river.

Actually, the structure consists of two spans, of plate-girder and continuous-girder construction, erected side by side on 31 T-type reinforced-concrete piers. Each span provides a 25-foot roadway flanked by a sidewalk. Just short of one-half mile in length, the bridge contains 5623 tons of structural steel, fabricated and erected by Bethlehem.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.
On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. Export Distributor: Bethlehem Steel Export Corporation

BETHLEHEM STEEL



Some foremen are highly cost-conscious; others are not. . . . Some are all-around good men, worth promotion; others barely get by. . . . Two recent studies pinpoint some of the factors that make for these differences.



DEVANEY PHOTOGRAPH

WHAT MAKES A GOOD FOREMAN?

ALFRED G. LARKE
Employer Relations Editor

AUTHORITY to make decisions regarding costs . . . Participation in departmental decision-making on money matters . . . How the foreman's boss himself feels about the importance of costs . . .

These are major determinants in how cost-conscious a supervisor will be, a timely study by the Survey Research Center, University of Michigan, shows.

In another study, conducted in the same company as the first, the Center took an interesting two-dimensional look at first-line supervisors—as management sees them from above and as the workers under them see them from below in the line organization. It comes up with proof that foremen are truly what many consider themselves, the men in the middle:

- In general, those whom management appraised as most promotable were also seen by the crews under them as the most effective. To be successful, the report of this study shows, the foreman must satisfy the expectations of both groups—his bosses and his workers.
- Very few of the best supervisors (by management appraisal) were held by the employees to be “pulling for the company” alone. The great majority of the most effective supervisors were among those their men labeled as “pulling for the company and the men.”
- Conversely, the men thought less of the foremen ranked unsatisfactory by management, than

they did of those ranked high. Where only 4 per cent of the best foremen were considered exclusively “company men,” 30 per cent of the low-ranked foremen were seen as “pulling for the company” only.

That employees agree so substantially with top management on who are the most effective supervisors may surprise any who are cynical about employee ability to judge objectively, but it should hearten those who have faith that, given light, people will find their way.

There may be disappointment that neither of the Michigan surveys comes up with any gimmicks—something that a man can hand to a staff errand-boy and say, “Here, try these out; they’re supposed to work wonders.” But both reports are full of details that will be of use to those who realize that human relations are a tough and subtle problem, on which any light that can be shed is a boon.

Both studies were made among supervisors of the eight accounting departments of an electric utility company, which perform not only the usual office-work functions but also such outside jobs as meter testing and meter reading.

The advantage of having first-line supervisors who are very conscious of costs scarcely needs belaboring, nor the advantage, therefore, of finding out as much as can be learned about what kind of supervisors have such an awareness. Floyd Mann, Assistant Program Director of the

Survey Research Center’s human relations program, and Howard Baumgartel, Study Director, who reported on the cost-concern study, point to the wide variation that can occur within a single company, or even within a single unit of a company.

In an earlier study of the company as a whole, when supervisors were asked whether they were very concerned, fairly concerned, not too concerned, or not concerned at all about costs in everyday operation of their jobs, it was found that in one of ten major units, 67 per cent checked the highest point on this scale. In another unit, only 32 per cent said they saw cost control as an all-important aspect of their jobs. Among the eight accounting departments, they found one in which no supervisor felt “very concerned” with keeping costs down. In another, five out of seven said they watched costs very closely at all times.

The job Mann and Baumgartel set themselves, with the aid of company executives, was to discover what *human relations factors*, if any, influenced these variations in cost concern.

Two cross-checks tended to bear out supervisors who said they were concerned: the most concerned had a tendency to be found on management’s list of promotables, and they were also reported by employees under them to be tougher about absences—an important cost factor.

Furthermore, there was a significant correla-

tion between foremen appraised highly by management and those who, employees said, put emphasis on getting out production. The poorer foremen were more likely to be "not too concerned" about productivity, according to their men.

These cross-checks established that the better supervisors were not merely paying lip service to cost control, but were doing something about it.

What the employees said about their foremen's concern with costs has significance, at least in a layman's eye, because it is independent of some other attitudes. For, the Survey Research Center found, through answers to other questions, what employees said about foremen's cost concern had nothing to do with how satisfied they were with the company, their wages, or their chances for promotion.

This is interesting, because in earlier studies the Survey Center had showed that:

(a) Satisfaction with the job itself, their supervisors and their fellow workers have a *lot* to do with whether a man is a steady worker or a frequent absentee (see "What Makes People Absent?" *Modern Industry*, April 1953).

(b) But only some of these attitudes—how the employee feels towards supervisors and fellow workers—are related to how productive a worker is (see "Getting to Know Your People," *Modern Industry*, April 1953).

New Ideas Needed?

In practical terms, this would mean that many if not most of the present "morale-building" activities such as talking up promotions, hammering at the value of fringe benefits, building up the company in the community's eyes, proving pay is area equivalent or better, all work principally towards attracting a better labor force. Something deeper is needed to get them and their supervisors onto the production and cost-cutting beam.

Looking at first-line foremen from the other direction—the point of view of *their* superiors—the Survey Research Center study shows anew the importance of the line relationship. A foreman's attitude is set, in part, by the attitude of his immediate boss.

In departments whose operating heads said they expected their supervisors to be very much concerned with costs, 60 per cent of the supervisors *were* so concerned. Where department heads said they did not expect such concern, only 28 per cent of supervisors said they were very concerned about the subject. What the department head expects, he gets, in great degree.

About the same ratios existed in departments whose head men said they themselves were much concerned with costs, or were not. Foremen followed the lead again, by and large.

"Responsibility" and "participation" are the answers many inductive reasoners have given to the question, "How involve people in the big company aims?" The Center's study lends some support to this answer.

Most department heads have complete say in determining how to spend money budgeted to them, Mann and Baumgartel found. Few supervisors do. The figures: virtually all department heads have "almost complete say." Only 19 per cent of first-line supervisors do. Of the rest, 29 per cent have "quite a lot of say," 23 per cent have "some say," 16 per cent have "very little say," 9 per cent have "no say," and 4 per cent did not answer. It's not hard to guess how much they had.

It Makes a Big Difference

What difference these variations in responsibility make in attitudes toward cost control is shown in these figures: Of the supervisors who had almost complete say, or quite a lot, 51 per cent expressed concern about costs. Of those who felt they had only "some," "little," or "no" say, 36 per cent worried much about the problem.

That was among the Accounting Department supervisors. The SRC tried this question on field foremen in the Overhead Lines Department, and on their general foremen. Of the field foremen (more like foremen in manufacturing industries), even those who felt they had a little say in how to spend budgeted funds were 100 per

cent concerned about costs. Of those who had *no* say, only 27 per cent were so concerned.

Of the general foremen—those who had quite a lot of say—78 per cent were very cost-conscious; of those who had little or no say, only 20 per cent.

Conclusion: In field or office, the foremen who have more responsibility for spending money are the most likely to be acutely interested in keeping costs down. Delegating responsibility pays.

Another finding: The supervisor who feels he is under pressure to keep costs down is somewhat more apt to be concerned to do so. Of supervisors in the utility's offices who felt under such pressure "a great deal" or "quite a bit," 58 per cent consciously kept after costs. Of those who were unaware of such pressure, only 38 per cent were as alert in cost-cutting. Roughly the same ratios occurred among field foremen.

Middle management, this would seem to show, don't expect supervisors to guess how interested they are in cost control; they must make their interest very explicit.

The Survey also discloses that the degree to which responsibility for costs is delegated is related to whether the supervisor's boss is willing

DUN'S REVIEW and Modern Industry

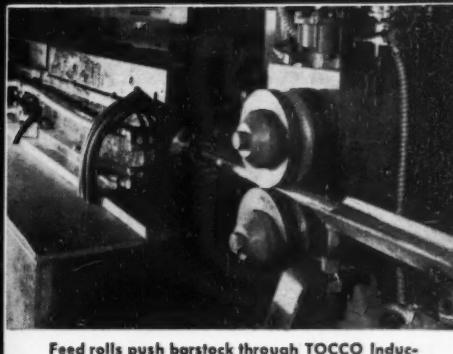
Executive
check
points

FOR THE RIGHT KIND OF FOREMEN—

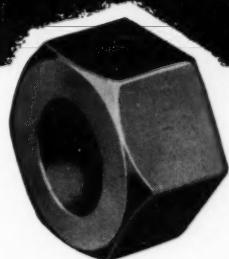
If you can answer these questions affirmatively about a foreman, Survey Research Center findings indicate, he is likely to be a superior supervisor, more effective, more promotable.

- Does the foreman have a good deal of latitude to make cost decisions?
- Is his immediate superior cost conscious, and articulate about it? . . .
- Does his superior often ask his help on mutual problems?
- Does he get to participate in departmental decisions on money matters?
- Does he give employees the impression he represents them to management, as well as representing management to them?
- Do employees find it easy to take up job problems with him? . . .
- Does he hold group discussions on job problems of the group? . . .
- Does he give his men some freedom to carry out tasks their own way, after work has been assigned and requirements made clear—instead of closely riding herd on his crew in every detail?
- Does he keep workers informed of how they're doing, where they stand?
- Does he go to bat for a worker who he thinks has a just complaint? . .
- Do workers ever discuss personal problems with him; does he give them the feeling he regards them as people, not just workmen?
- Does he ever recommend pay increases for men who do good work? . .
- Does he train members of his crew for promotion?
- Does he praise them for good work, and let *his* boss know of the good people under him?
- Do those working for him consider him a likable, reasonable leader? . .
- Does he show employees easier and better ways to work?

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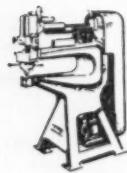
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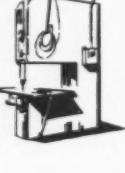
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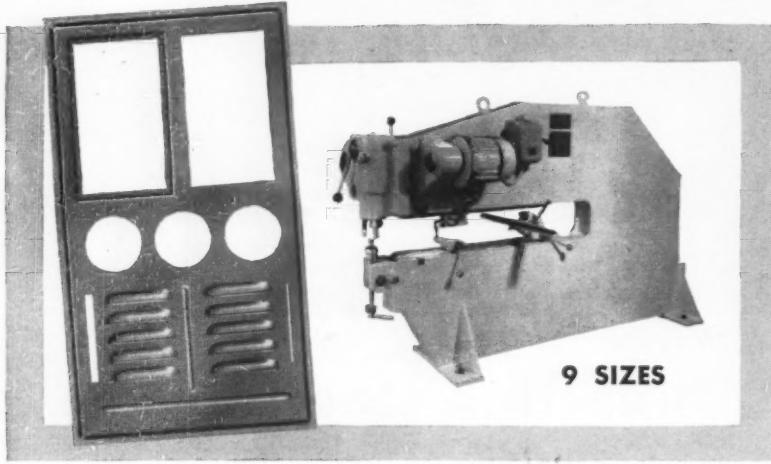
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WHAT MAKES A GOOD FOREMAN?

Continued

	EMPLOYEES LIKE	SUPERVISORS FIND EFFECTIVE
RECOMMEND PAY INCREASES	1	1
TRAIN EMPLOYEES FOR BETTER JOBS	2	6 ←
RECOMMEND PROMOTIONS	3	3
GIVE MORE RESPONSIBILITY	4	4
PRAISE SINCERELY AND THOROUGHLY	5	5
GIVE MORE INTERESTING WORK	6	9
TELL SUPERIORS	7	7
GIVE PRIVILEGES	8	8
GIVE A PAT ON THE BACK	9	2 ←
MAKE NOTES OF IT IN RATINGS AND REPORTS	10	10

What employees want from foremen

Except for three items, employees and supervisors queried in the Michigan survey agreed on the ranking for methods of recognition. Although both rate pay increases first, as might be expected, they are far apart as to the second most effective kind of recognition: "a pat on the back," said supervisors; "training for better jobs," said employees.

to delegate responsibility in the first place. If management is unwilling to give supervisors real responsibility in budget-making and review, it should not be surprised if they show little concern with costs.

Involvement of supervisors in departmental decision-making about changes-in-general does not necessarily change their concern with costs. To change attitudes about the importance of *costs*, involvement must be in the specific area of money matters.

For those in management who want to change concern with costs, the study ends optimistically. The researchers found that supervisors want more responsibility for costs.

In the Center's second study, reported by Mann and James Dent, Study Director, each of the first-line foremen was rated by four superiors, including his own department head, on performance and qualifications. They were graded as immediately promotable, promotable, "satisfactory plus," satisfactory, questionable, and unsatisfactory. The researchers then conducted a study among their employees to find how foremen standing high in management's favor differed—as employees saw them—from those with low management ratings.

Results showed that employees tended to agree with management judgments. Thus, more of them said of the high-rated foreman than

of the low-rated one:

- He is good at handling people.
- He is a man with whom employees feel free to discuss important things about their jobs.
- He is also one with whom employees feel free to discuss personal problems. This quality has also been shown, in other studies, to be importantly related to employee productivity, absences, identification with company aims.
- He goes to bat for the men, supports them rather than discourages them when they have complaints.
- He pulls for company and men.
- He lets his employees know where they stand, even where not required to do so by formal rating.
- He lets the men work pretty much on their own instead of supervising them closely; gives general instruction, makes sure the employee knows what has to be done, then lets him work in his own way.
- He holds frequent group discussions to discuss common problems.
- He gives recognition for good work done.
- He trains men for better jobs.
- He is seen as "a leader," "likable," "reasonable," not "bossy," "quick to criticize," "a driver," nor "unnecessarily strict."

More details of both studies are available from the University of Michigan in two 75-cent reports, *Concern with Costs*, and *Appraisals of Supervisors*.



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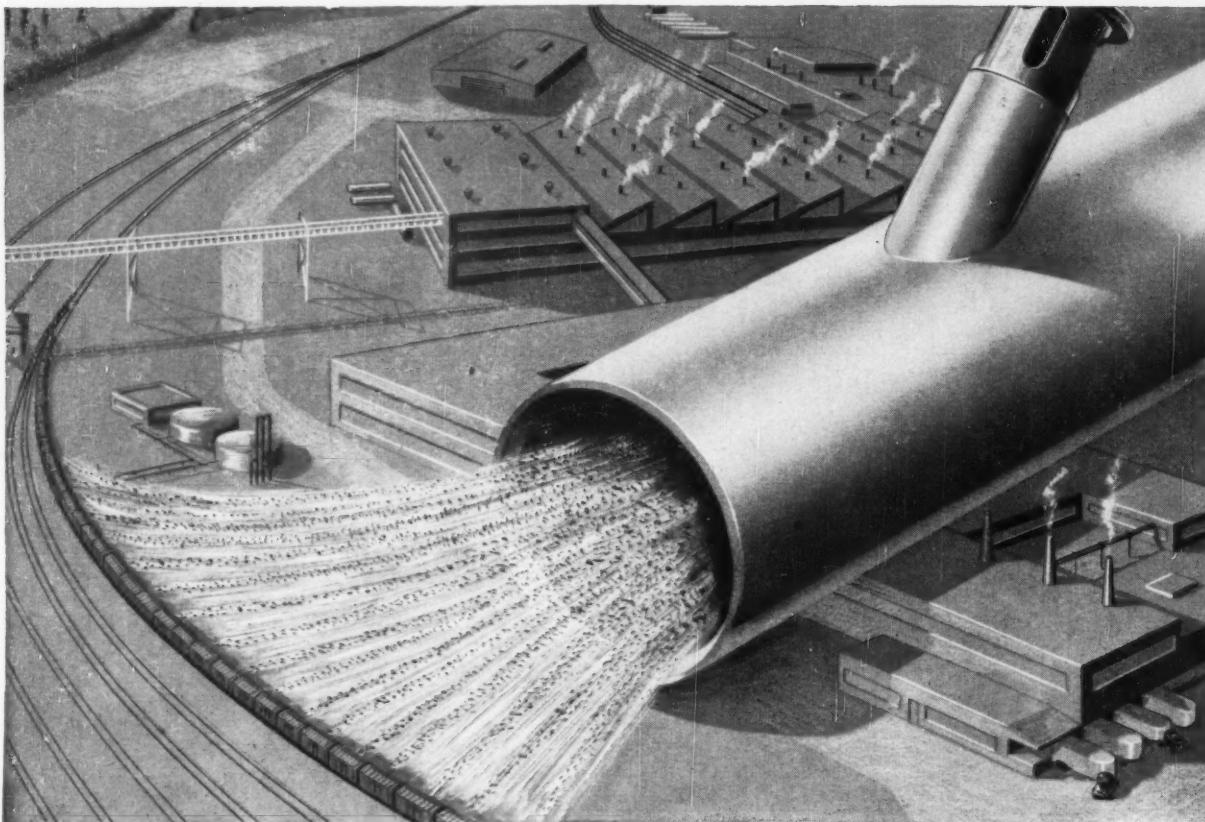
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Carbide cutting tips and die inserts are getting better, cheaper, and even more useful. New suppliers are entering the field and there is a raft of new literature on carbides and their application in equipment requiring high hardness and abrasion resistance.

Proceedings of the full-dress symposium on carbide tooling held in connection with the Spring ASTE meeting are now obtainable from L. N. Gulick, School of Mechanical Engineering, University of Pennsylvania, Philadelphia 4, Pa.

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offered free of charge by such carbide-producers as Allegheny Ludlum, Carboloy, Firth-Stirling, Kennametal, and Sintercast.

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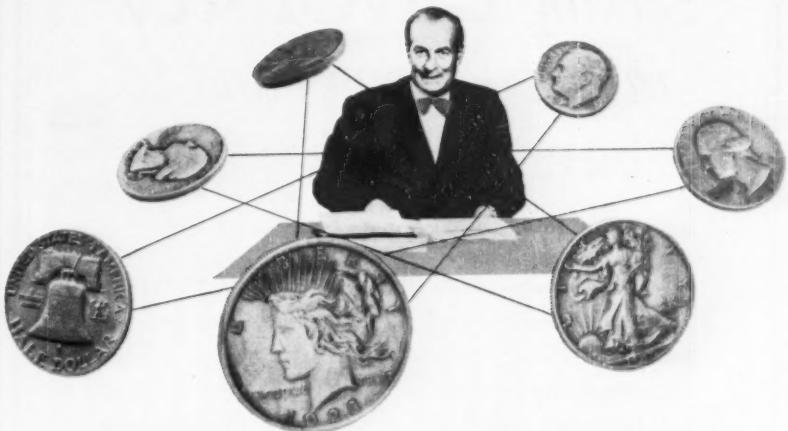
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Among the new suppliers in the carbide tool field is Elgin National Watch, Elgin, Ill. Its abrasives division, already a major processor of diamond powder, has just begun production of tungsten carbide rotary cutting and grinding tools for precision metalworking.

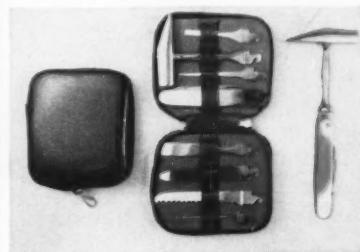
A tool kit no bigger than a pack of cigarettes, and an optical comparator the size of a pack of mints should permit anyone to become a travelling tool room without even a bulging pocket.

The tool kit, pictured here, contains a hammer, wood chisel, saw, file, drill, punch, screwdriver, and

jack knife. Made in Germany, it's obtainable from Abbeon Supply Company, Jamaica 32, New York for \$13.50.

The optical comparator, for checking screw threads, tool bits, wire sizes, and the like, is distributed by National Tool Company, Cleveland 2, Ohio. Called the "Pee Gee," it comes equipped with a reticle (viewing screen) scaled for measuring dimensions from 0.0025 to 0.5 inches and 0 to 0.1 mm. Other reticles, marked for angles, thread gages, circle diameters, and the like, may be obtained separately. The comparator, priced at \$9.75, is less than an inch in diameter and two inches high, has a transparent plastic barrel, and comes in a screw-top plastic case.

Spirit duplication made faster and cleaner, is the claim for the new "Azograph Process," recently introduced by the A. B. Dick Co., 5700 W. Touhy Avenue, Chicago, Ill. This process promises to alleviate the time and cost of cleaning up by having the color forming materials separated in the transfer sheet coating. These cannot form the color until a third element, safe



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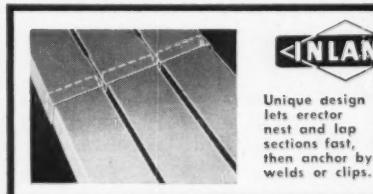
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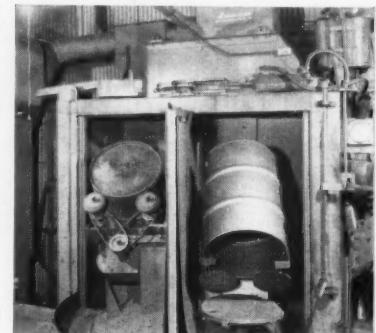
GENERAL  **ELECTRIC**

inside a small tank on the duplicator, unites them. By such separation, stained hands and clothing and messy copies are reduced to a minimum, according to the company. It will be available on both hand and electrically operated machines.

Calculators are handy machines to have around the office, whether the business be large or small. One of the latest additions to this family is a light-weight, portable, compact, ten-key machine, brought out by Facit, Inc., 500 Fifth Avenue, New York, N. Y. Hand operated, the Facit TK comes in a travelling case and is claimed to be dustproof, rustproof, and adaptable to all climates.

Cleaning steel drums of 30 and 55 gallon capacity, prior to painting and coating, can be handled as a continuous operation through the use of its new airless abrasive blasting machine, says American Wheelabrator & Equipment Corporation, Mishawaka, Ind. Each work station holds two drums, one in the blast area and the other being

either loaded or unloaded. The picture below shows the turntable halfway through the turning operation. The partition seals off the blast area and action is controlled by push button. Cleaning is accom-



plished by abrasive hurled against surfaces by centrifugal force. Lids, too, are cleaned at the same time by use of a special fixture.

The vital role played by heat exchangers in such diverse fields as air conditioning and atomic energy, radar and refrigeration, and the growing fund of knowledge available for their design and application, is pointed up by Trane Company's new "House of Weath-

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er Magic," a research laboratory that has everything from sound-proof rooms to wind tunnels. Trane, which proudly notes that it is "the only manufacturer of major size and reputation" in all four fields of air conditioning, heating, ventilating, and heat transfer, says the new laboratory will not only test new product designs, but also conduct basic studies on coil design, refrigerants, and the like. Opening of the laboratory is an important milestone—and a real promise of even more exciting developments to come.

More than \$30,000 was saved, Tacoma Powdered Metals Company reports, by building electroplating tanks of resin-overlaid Douglas fir plywood, instead of using standard construction. The company uses 54 electrolytic cells, each with a capacity of 350 gallons, to turn out high-quality powdered iron for self-lubricating bearings and other powder metallurgy products. The cells, one battery of which is shown in the photograph, have been in operation for four years now and, TPM says, show no sign



of deterioration. The plywood panels are acid-resistant, and are bonded with waterproof glue. They need little framing or support, are strong and light in weight.

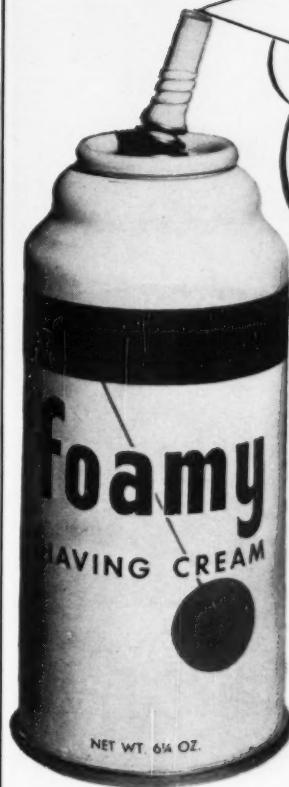
Air power takes to the road—and travels in style in a new mobile plant designed and built by Clark Bros. Company of Olean, New York. Developed for the Navy, but likely to find a good many industrial jobs in the event of an emergency, the unit consists of two heavy-duty air compressors with a combined output of 5,000 cubic feet a minute. Each compressor, complete with its own motor, lubricat-

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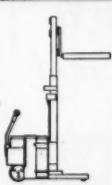
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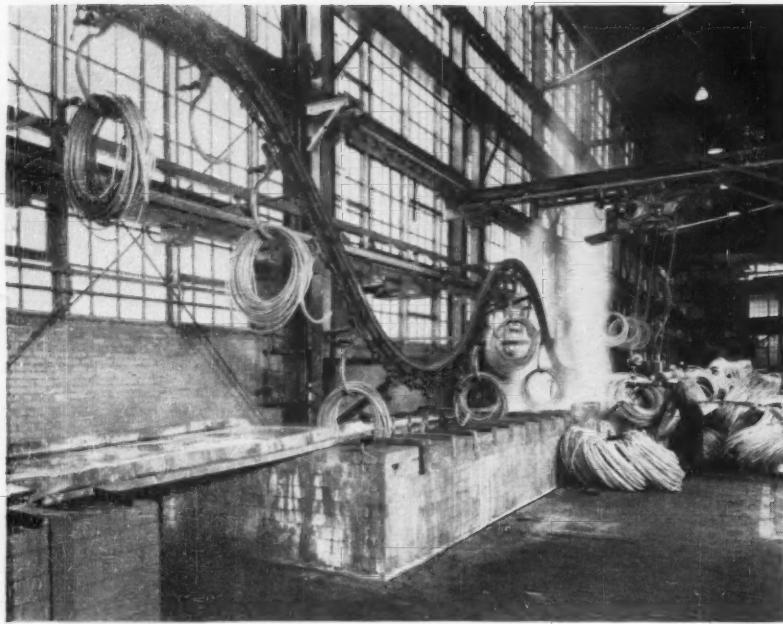
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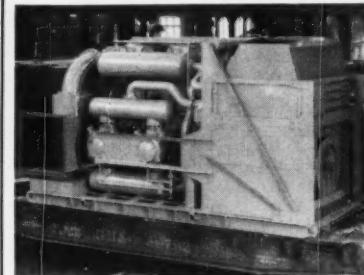
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Engineering Offices or Sales Agencies in Principal American and Canadian Cities

ing, and cooling system is mounted on a skid (photograph, below), and the two units, side by side, slide neatly into a 60-foot railway box car. Clark engineers point with pride to the fact that they were able to meet the Navy's tough specifica-



tions with only relatively minor modifications of one of their standard air compressors. Indeed, one of the specifications was that all components be standard products to facilitate maintenance and repair. Others: operation for long periods at temperatures from minus 25° to plus 125° fahrenheit, and under severe humidity conditions; ability to withstand heavy impact; and minimum displacement by vibration (less than 0.30 inches in any direction).

Heavy grinding operations with reduced stalling, faster starting, and less expensive operation, are among the results reported for the latest improvements in standard seven-inch grinders manufactured by the Delta Power Tool Division of Rockwell Manufacturing Co.,



100-Pound Girl Moves 1000-Pound Load!

Amazing Magcoa/Tobey feather-weight heavy-duty aluminum industrial trucks save money, manpower 3 ways:

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NEXT MONTH . . .

Peter F. Drucker discusses in his series on The Practise of Management—another important phase of running your business.

Be sure you read it in the August issue of Dun's Review and Modern Industry



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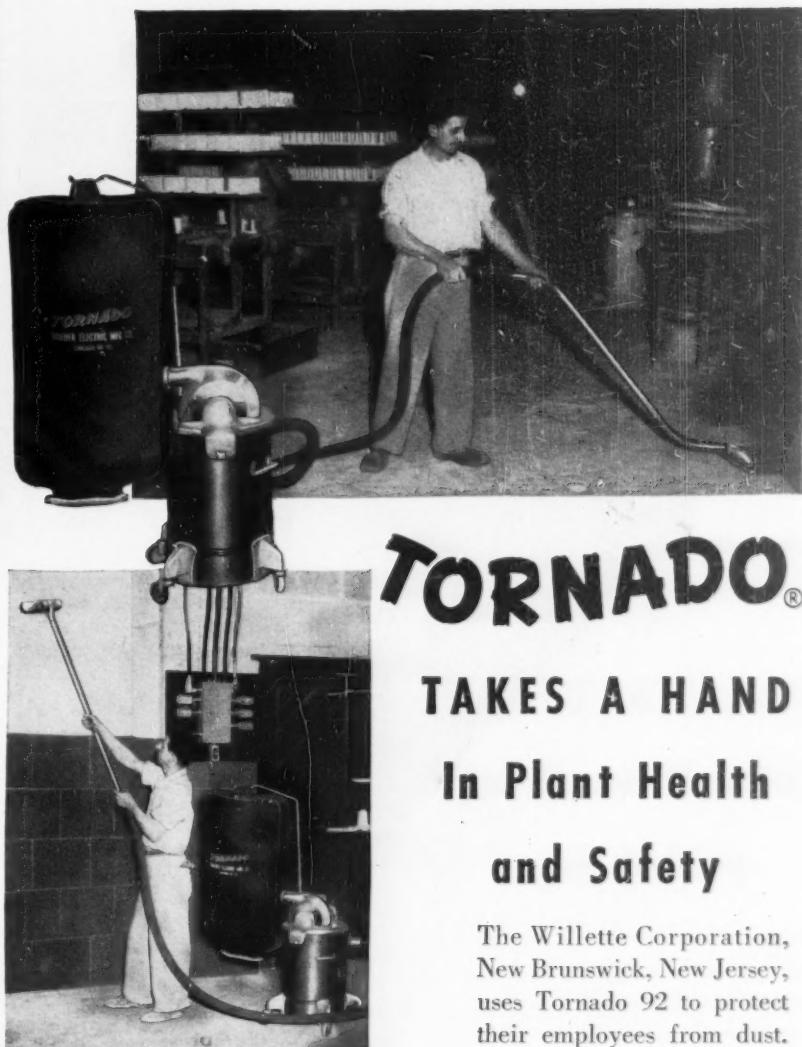
able on all capacities of Whiting overhead cranes and can be installed on older models.

Electronic offices may be a dream of the future to many, but International Business Machines Corporation, New York, N. Y., is taking definite strides in that direction. Recently introduced was the "702" electronic data processing machine, said to be capable of perform-



ing more than ten million operations in an hour. Specializing in arithmetic and logic, the central unit works in conjunction with a group of cathode ray "memory" tubes, into which magnetic tapes feed the necessary data. Size of the units may be judged from the picture above. The machines are for rental only and are expected to be used by large industrial and insurance companies.

Aluminum foil joins the list of pressure-sensitive tape materials. Minnesota Mining & Manufacturing Company, which is now producing aluminum foil tape, notes that its heat-reflecting ability, electrical conductivity, and resistance to moisture and weathering should find it a variety of industrial jobs—sealing overlap joints of metal



The Willette Corporation, New Brunswick, New Jersey, uses Tornado 92 to protect their employees from dust.

Manufacturers of ceramic bathroom accessories, Willette has a problem with the clay dust that accumulates on floors and ceilings. Sweeping with brooms only stirred up the dust.

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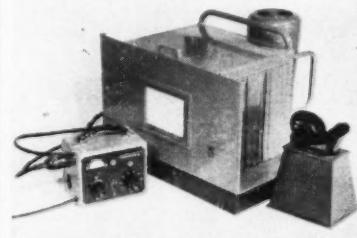
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Exclusive U.S. Distributors: Addo-X Adding Machines
Multi Calculators — Roneo Mimeograph Machines

sheets, protecting against radiant heat, masking areas during electroplating, and as an electrical conductor. The tape is a little over five mils thick, has a tensile strength of 32 pounds, and an adhesion strength of 60 pounds per inch of width. Sold through industrial distributors, it's available in 60-yard rolls, $\frac{1}{4}$ to 24 inches wide.

New industrial X-ray and fluoroscopy unit is specifically designed for continuous production-line use — inspecting packages, checking soundness of metal, rubber, plastics, and ceramic parts, and the like. It is fully portable (none of its components weighs more



than 50 pounds), and will operate from a standard 110 or 220 volt A.C. power supply. Made by North American Philips Company, Inc., 750 South Fulton Avenue, Mount Vernon, N.Y., and called the "MG 60," it consists of three components: The X-ray unit itself (center), a control box (left), and a fluoroscopy box. According to Norelco, current consumption is approximately two amperes, and permissible continuous output is four milliamperes at 60 kilovolt potential.

New chemical plants, employing new and vastly more efficient processes, continue to come on stream. Two of the newest:

- Allied Chemical's ethylene oxide and glycol plant. It marks the first U.S. (and second world) application of Scientific Design Company's catalytic oxidation process for direct combination of ethylene with oxygen, eliminating need for chlorine; and greatly simplifying the manufacturing process.
- Gulf Oil Corporation's 9-million-pound capacity plant for iso-octyl alcohol. This chemical, which is used in making plasticizers, synthetic lubricants, surface active agents, and many other products, signals Gulf's entry into the general organic chemical market.



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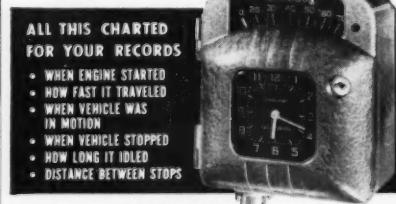
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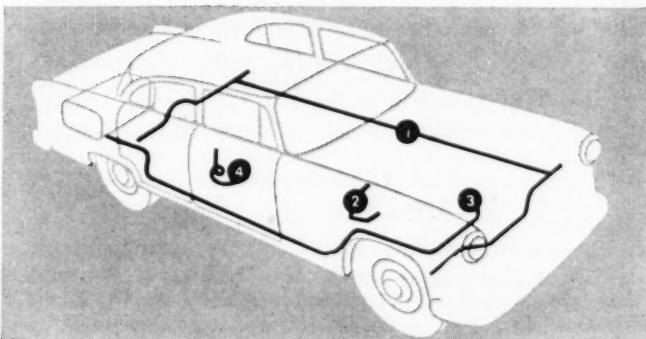
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Will your brakes work, or have they crossed their last road?



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- 3 Bundyweld helps gasoline lines stay smooth, leakproof despite battering from flying stones, punishing vibration.
- 4 To help make push-button windows foolproof, auto manufacturers use Bundyweld to conduct the hydraulic fluid.

For many good reasons, your brakes will work. One reason we're thinking of: your hydraulic brake lines are made of Bundyweld Tubing.

The manufacturer of your car gives you Bundyweld protection because this tubing is leakproof, almost immune to vibration fatigue — and fifteen times stronger than necessary to protect your life. In fact, *Bundyweld is so dependable it's used in 95% of today's cars in an average of 20 applications each.*



Made by the world's largest producer of small-diameter tubing, Bundyweld Steel Tubing is the only tubing double-walled from a single metal strip, copper-bonded through 360° of wall contact.

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Sales pull



These are the *daytime* Station-to-Station rates for the first three minutes. They do not include the federal excise tax.

Long Distance doesn't cost—it pays

These competitive days, executives everywhere are turning to more productive selling methods.

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Long Distance is fast. It will take you North, South, East and West in a matter of minutes. So you can keep in regular touch with even the most widely scattered customers and prospects.

It is personal. Like a face-to-face visit, it gives you the advantage of friendly two-way discussion, helps to prevent misunderstandings, builds good will.

And rates are low—much lower, we find, than most people think.

We have some specific suggestions for the profitable use of Long Distance in Sales, Purchasing, Administration, Traffic, Production, Engineering and Accounting. A call to your Bell Telephone Business Office will bring a representative to discuss them with you.

Call by Number. It's faster.

BELL TELEPHONE SYSTEM





DOOR GUARD IS EXTRUDED plastisol based on BAKELITE Vinyl Dispersion Resins. Fastened to stile and jamb, the plastic strip covers the usual gap at butt side of door . . . prevents mashing of fingers. Though this strip flexes and stretches hundreds of times a day, it won't crack or distort. It defies weather and sunlight without deteriorating or fading. By The Stanley Works—Magic Door Division—New Britain, Conn.



SLIP-PROOF GRIPS are made by dip-coating shear handles in plastisols made of BAKELITE Vinyl Dispersion Resins. The firm, cushioning grips hold fast to metal . . . won't crack or peel in hard use. Tough and resilient, they resist abrasion, twisting, distortion . . . defy oil, grease, chemicals, water. By H. K. Porter Inc., Somerville, Mass.



FISHERMEN BENEFIT from this improved nylon tapered line coated with plastisols made of BAKELITE Vinyl Dispersion Resins. The lightweight plastic coating needs no treatment . . . yet will not absorb water while floating on the surface. It also protects against excess wear, giving the taper longer life. By Sunset Line and Twine Co., Petaluma, Calif.



PROTECTIVE PLASTISOL COATING prevents galvanic corrosion between copper and aluminum conductors in the electrical connector. Plastisol coating based on BAKELITE Vinyl Dispersion Resins seals out air and moisture . . . withstands ravages of weather to ensure long connector life. By Burndy Engineering Co., Inc., Norwalk, Conn.

Cut production time . . . boost sales appeal

Take a look at these diverse products. Each uses fluid, fast-curing plastisols based on BAKELITE Vinyl Dispersion Resins differently. Each benefits in added sales appeal and ease of production by the many useful properties of these easy-working materials.

No special equipment is needed to fabricate these plastisols. They adapt to slush-molding, extrusion, dip-coating or pouring. They form under little or no pressure . . . cure at 350 deg. F.

Plastisols based on BAKELITE Vinyl Dispersion Resins are extremely faithful

to intricate mold details. They give you a choice of either dull or glossy finishes. And any color can be obtained simply by adding pigment.

The finished products are tough and flexible. Plastisols based on BAKELITE Vinyl Dispersion Resins resist abrasion, cracking, distortion and automobile engine heat. They defy strong chemicals, soaps, oils, greases and corrosive atmospheres. Their excellent dielectric qualities are another major selling point. For the full story of BAKELITE Vinyl Dispersion Resins, write to: Dept. XY-6.

Data courtesy of Stanley Chemical Company, East Berlin, Conn.



SHELL MOLDS made with BAKELITE Phenolic Resins are light in weight, speed handling. Accurately reproduce pattern details, cut machining and finishing. Can be stored to meet future production schedules. Made by The Cooper Alloy Foundry Co., Hillside, N. J.



80% SAVING in construction costs resulted from use of reinforced plastics—BAKELITE Polyester Resins and glass cloth—for this Navy bomber stinger tail. Seventeen feet long, it carries submarine detection devices. Made by Zenith Aircraft, Div. of Zenith Plastics Co., Gardena, Cal.

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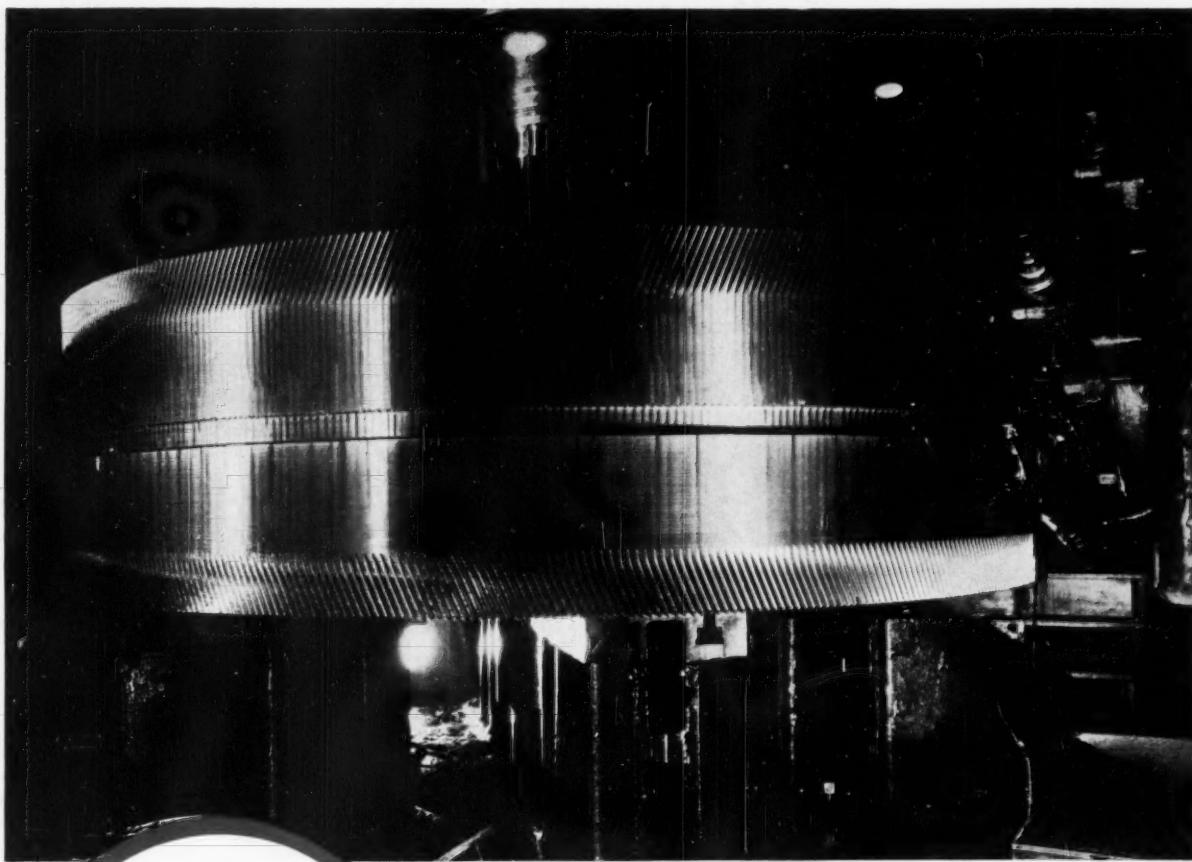
VINYL DISPERSION RESINS

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WASTEBASKET molded of BAKELITE Polyethylene is tough, resilient, lightweight. Won't dent if dropped. Washable in soap and water. Comes in a variety of opaque colors. Resists chemicals, most acids, and alkalies. Made by Loma Plastics, Inc., Fort Worth, Tex.



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